S. HRG. 102-255, PT. 4

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED SECOND CONGRESS

FIRST SESSION

ON

S. 1507

AUTHORIZING APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEARS FOR THE ARMED FORCES AND FOR OTHER PURPOSES

PART 4

CONVENTIONAL FORCES AND ALLIANCE DEFENSE

APRIL 22; MAY 7, 10, 1991

Printed for the use of the Committee on Armed Services

U.S. GOVERNMENT PRINTING OFFICE

43-453 ⇆ WASHINGTON : 1991

S 201-22

For sale by the U.S. Government Printing Office
Superintendent of Documents, Congressional Sales Office, Washington, DC 20402
ISBN 0-16-036852-9

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

MONDAY, APRIL 22, 1991

U.S. SENATE,
SUBCOMMITTEE ON CONVENTIONAL FORCES
AND ALLIANCE DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

AIR FORCE ACQUISITION PLANS AND MODERNIZATION REQUIREMENTS

The subcommittee met, pursuant to notice, at 2:34 p.m. in room SR-222, Russell Senate Office Building, Senator Carl Levin (chairman of the subcommittee) presiding.

Committee members present: Senators Levin, Cohen, and Wallop.

Committee staff members present: Daniel G. Sakura, research assistant.

Professional staff members present: John J. Hamre and Michael J. McCord.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; George K. Johnson, Jr. and Durwood W. Ringo, Jr., professional staff members.

Staff assistants present: Kelli J. Corts and Julie W. Kemp.

Committee members' assistants present: Kenneth N. Luongo, assistant to Senator Levin; William J. Lynn, assistant to Senator Kennedy; Phillip P. Upschulte, assistant to Senator Glenn; Terence M. Lynch, assistant to Senator Shelby; James M. Bodner, assistant to Senator Cohen; Anthony H. Cordesman, assistant to Senator McCain; Thomas G. Moore, assistant to Senator Wallop; Eric H. Thoemmes, assistant to Senator Coats; Saul H. Singer, assistant to Senator Mack; and Thomas L. Lankford, assistant to Senator Smith.

OPENING STATEMENT OF SENATOR CARL LEVIN, CHAIRMAN

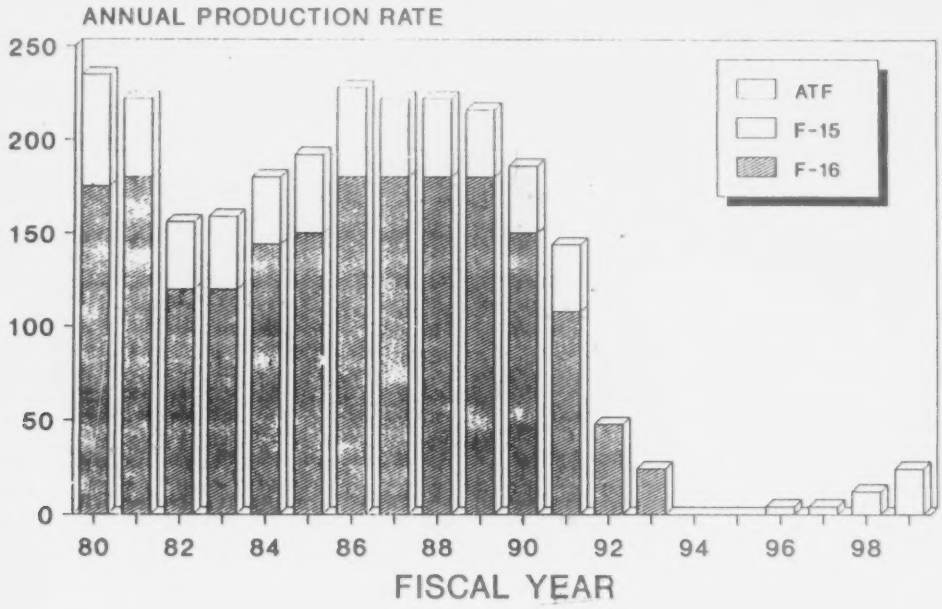
Senator LEVIN. Good afternoon, everybody. This afternoon the Subcommittee on Conventional Forces and Alliance Defense holds its first hearing on the fiscal years 1992/1993 budget request.

Senator Wallop, who is our Ranking Member, is going to be joining us a little bit later. Senator Cohen is with us now, and we are delighted, of course, that Senator Wallop is our ranking member and that Senator Cohen is again a member of the subcommittee.

Because this is the first hearing of the subcommittee, I would like to take a few moments to outline what I see are the key challenges that we face this year. No subcommittee is confronted with such far-reaching changes as is the Conventional Forces Subcommittee.

The budget request this year has two very clear themes. Most of the major acquisition programs that have been the backbone of conventional force modernization during the 1980s are being terminated, and the chart behind me shows the major weapons systems in the jurisdiction of this subcommittee that have been recently terminated or are proposed for termination with this budget system, and the systems that are listed here are the kinds of weapons that proved so effective recently in Operation Desert Storm.

AIR FORCE FIGHTER PRODUCTION
F-15/F-16/ADVANCED TACTICAL FIGHTER



PROGRAM TERMINATIONS
CONVENTIONAL FORCES SUBCOMMITTEE

ARMY

- AH-64 APACHE ATTACK HELICOPTER
- OH-58D AHIP HELICOPTER
- STINGER MISSILE
- MULTIPLE LAUNCH ROCKET SYSTEM
- M-1 TANK
- BRADLEY FIGHTING VEHICLE
- M-88 RECOVERY VEHICLE

NAVY

- F-14 FIGHTER
- PHOENIX AIR-TO-AIR MISSILE

AIR FORCE

- F-15E FIGHTER
- F-16 FIGHTER
- MAVERICK MISSILE
- TACIT RAINBOW MISSILE

At the same time that these programs are being ended, the services are pressing ahead with plans to build new technology replacements. Most of those replacements will not be available until the end of the decade, or even later. More important, in many instances we are not just losing a production line, we are losing an industry. If these programs are terminated, we may find that it takes years to rebuild the industry that we are terminating, and we will find a big price tag on any rebuilding from scratch.

Let me say at the outset, I do not have an easy answer for any, much less all, of these problems. We may not be able to solve them. But this clearly represents the primary challenge that we face this

year, as we review the budget request and the associated Future Year Defense Program.

Our hearing today focuses on Air Force acquisition plans and modernization requirements. The Air Force is facing this situation directly in its plans for fighter production. The Air Force proposes to proceed with full-scale development of the Advanced Tactical Fighter (ATF), and at the same time terminate production of the F-15 and the F-16, and as we can see also from the chart behind me, the Air Force procured an average of almost 200 aircraft per year during the 1980s.

Both of the fighters—the F-15 and the F-16—are scheduled to be terminated with this budget submission. There will be no fighter production for the rest of the decade, except for the low-rate initial production of the Advanced Tactical Fighter. While we would like to proceed with the ATF and continue to buy the F-15 and the F-16, the resources do not permit it, so we have to make some hard choices. The Air Force has opted for long-term modernization at the expense of near-term production. They have also opted for no production bridge to the long-term modernization plan, at least in terms of the Multirole Fighter (MRF).

One of the major questions that we have to face is whether the dollars that we save in the near term are offset by the higher long-term costs of having to rebuild production capability. We intend to explore these consequences today, first from a panel which is composed of Mr. Robert Hale, the Assistant Director for National Security and International Affairs at the Congressional Budget Office. Mr. Hale is accompanied by Ms. Lane Pierrot who is the primary analyst for the study that we commissioned on this subject.

After we receive the Congressional Budget Office's testimony, we will hear from Maj. Gen. Joe Ralston, Director of Tactical Programs, and Maj. Gen. Richard Hawley, Director of Operations in the Office of the Deputy Chief of Staff for Plans and Operations. While General Ralston will have some remarks to make in open session, we may have to go into closed session for the rest of his testimony, and I would like to state for the record that the closed session will deal with the ATF only in generic terms. The Air Force is in the final stages of source selection in the ATF competition. We will not discuss—I will emphasize that—we will not discuss either of the proposals, and the Air Force will refer to the ATF in both the open and closed sessions only in generic terms.

Before we proceed to the first panel, let me turn to Senator Wallop to see if he has any additional comments or observations. As I mentioned just a brief moment ago, we are delighted that our ranking Republican this session is Senator Wallop. We have worked together a long time on many issues and we are delighted that he is the ranking member of this subcommittee. Senator Wallop?

Senator WALLOP. Thank you, Mr. Chairman, and I will be brief. I join you in welcoming Major General Ralston and Major General Hawley, together with Mr. Hale and Ms. Pierrot, to this hearing before the subcommittee, which I consider to be very important.

The political attention and program excitement surrounding the ATF development have created an altogether appropriate topic for this hearing—for the first hearing of this year for this subcommit-

tee, and since the results of the ATF source selection are imminent, this particular hearing becomes even more timely, notwithstanding referring to it in generic terms.

Mr. Chairman, I would express my great pleasure in having the opportunity to join you in a more active leadership role with this subcommittee as ranking member. It is with some humility that I step into the large shoes vacated by now-Governor Pete Wilson, but the fairness and insight which have been the hallmark of your guidance of this panel will continue to be my inspiration. So I look forward to working closely with you and your unmatched professional staff led by Dr. John Hamre as we reinforce the need for conventional force modernization in the face of dramatic structural changes.

To this end, it will be my commitment to support advancing technologies and capabilities for our Armed Forces. Operation Desert Storm, I think, vividly proved that we must never be guilty of sending fighting men and women into combat without the best and most modern equipment this technology will support, even if doing this demands that we spend a little more up front. The real cost-effectiveness was demonstrated and can only be finally measured in terms of the lives saved.

The task is difficult, as we place proper attention on modernization in the very face of force structure reductions. As I have already implied, it is this downward force structure trend which makes it all the more critical to have the force multiplication and increased effectiveness available through the next generation of technology.

In closing, let me thank our witnesses for sharing their time and experience with us today. I hope we will continue to work together to ensure that the Air Force will always possess the tools and equipment necessary to repeat an Operation Desert Storm performance should a future need arise, as I have no doubt that at some moment in time it will. Thank you, and I look forward to your testimony.

Senator LEVIN. Thank you, Senator Wallop. Senator Cohen?

Senator COHEN. Mr. Chairman, just an observation. I think the hearing is both timely and important, because we are going to begin this process of trying to analyze whether or not we can come up with the cost to match the capability that the Air Force and other branches of the service would like to have for the future.

I am always fond of quoting from Norman Augustine in his book, Augustine's Laws, in which he said, "if the present trends continue, by the year 2050 the entire defense budget will consist of one tactical aircraft that will be shared by the Air Force and the Navy, except on Leap Year, in which it will be shared on that day with the Marine Corps." Apparently, that seems to be the direction in which we are going in terms of the cost as well as the capability of the new aircraft that we would like to procure.

I think this is an important hearing and look forward to hearing what the Congressional Budget Office has to say about whether or not we can afford a new or several new types of aircraft in the coming years.

Senator LEVIN. Thank you for mentioning John Hamre of my staff, and Les Brownlee and Skip Ringo of your staff. Nice going,

John, in really bringing tremendous capability and professionalism to this subcommittee. Now we will call on you, Mr. Hale.

STATEMENT OF ROBERT F. HALE, ASSISTANT DIRECTOR, NATIONAL SECURITY AND INTERNATIONAL AFFAIRS DIVISION, CONGRESSIONAL BUDGET OFFICE; ACCOMPANIED BY LANE PIERROT, PRINCIPAL ANALYST

Mr. HALE. Thank you, Mr. Chairman. I do appreciate the chance to testify today. I have a prepared statement that I will submit and give you an oral summary.

In the coming months, Congress and the administration will be making decisions about the Advanced Tactical Fighter (ATF) and the Multirole Fighter (MRF), the follow-on to the F-16. My testimony today addresses many issues, but it focuses primarily on affordability. That is, how are these decisions going to affect the ability of the Air Force to meet its numerical requirements for aircraft?

The Air Force should have little trouble meeting its numerical requirements during the 1990s. Over the next 6 years, the administration plans to buy only 72 F-16s and 8 ATFs. While this level of procurement, as the chairman has pointed out, is very low—extremely low by historical standards—it is more than adequate in a period when the Air Force also plans to reduce from 35 tactical fighter wings to 26 wings. Indeed, the Air Force will have to retire more than 1,000 aircraft before the end of their normal service lives in order to accommodate the sharp cut from 35 to 26 wings.

From a standpoint of numbers of aircraft, it is really a shame that some of these planes cannot be "freeze dried" or otherwise preserved. They might be quite useful in the next decade because, by that time, the outlook for meeting numerical requirements for Air Force aircraft will be much less bright.

In the long term, the Congressional Budget Office's base case analysis concludes that, under the administration's current plan, the Air Force could maintain only about 18 tactical fighter wings rather than the planned 26 wings. You can see this result on the board to my left.

TABLE 1. AVAILABLE WINGS UNDER VARIOUS ASSUMPTIONS

Assumptions	Available Wings in 2025
Base Case	18
More Favorable Assumptions	
Base Case but Share of Funds Grows[a]	20
Base Case but Average Age at Retirement Is 28 Years	22
Base Case but Multirole Fighter Costs Less[b]	21
Base Case but Air Force Accepts Smaller Share of Most Capable Planes	20
Less Favorable Assumptions	
Base Case but Share of Funds Declines[c]	16
Base Case but ATF Costs More[d]	15
Base Case but ATF Costs Substantially More[e]	12

SOURCE: Congressional Budget Office.

a. Average 1975 to 1991 share.
b. Approximate contractor estimate ($25 million).
c. Average 1982 to 1991 share.
d. F-15 A/B models to F-4 ($100 million).
e. F-15 (all models) to F-4 ($135 million).

Now, when I say 18 wings in the long term, I mean long term. The Congressional Budget Office is forecasting out to the year 2025, which is the first year when the decisions you are going to be making in the next several years will influence or determine all of the planes in the Air Force inventory. However, the drop below 26 wings could well begin much earlier than the year 2025, perhaps in the next decade.

What is in our base case analysis that drives the Air Force down to 18 wings? There are two factors that have the greatest influence: how much money can be spent on the planes, and how much each plane costs.

Of course, it is impossible to know for sure how much money the United States will be able to spend over the next several decades. But, to illustrate a plausible level of funding that seemed consistent with history, the Congressional Budget Office's base case estimate assumes that tactical aircraft receive the same share of the total Air Force budget—about 5.2 percent—that they received between the years 1965 and 1991. The years between 1965 and 1991 included two periods of peak funding for tactical aircraft. So we are

assuming in this analysis that tactical aircraft receive budgetary priority several times over the next few decades. We applied the 5.2 percent to the administration's planned funding for the Air Force in 1995—that is, the last year of the budget agreement.

Unit costs of aircraft are another important factor in the decline to 18 wings. Our base case assumes that the ATF costs about $73 million apiece—in 1992 dollars—and that is the current Air Force estimate.

Now, there is no Air Force estimate available for the cost of the MRF, the follow-on to the F-16. In our base case, we assume that each MRF would cost about $35 million. Because the administration plans to end production of all existing aircraft, the Congressional Budget Office assumed that the MRF would be an entirely new plane rather than a derivative of an existing aircraft. That assumption appears to be the only one consistent with the current administration plan.

We arrived at our estimate of $35 million by increasing the cost of today's F-16 by 80 percent. That is the least amount of growth that has ever been experienced since World War II from one generation of aircraft to another.

When these and other assumptions are put together, the result is clear. At the prices the Air Force may have to pay for tactical aircraft in the future, historical budget shares simply do not provide enough funds to equip 26 wings.

Now, of course, it is possible that the Air Force will get more money. Added funding of about $2 billion a year for tactical aircraft would permit the Air Force to maintain 26 wings. It may be risky, however, to plan a force assuming such growth in defense budgets, particularly in a period when threats to U.S. security have declined. Even if there is no budgetary growth, there are other favorable assumptions, each of which would permit the Air Force to add at least a couple of wings above this number of 18. Several of those assumptions are listed over here on the board to my left.

The Air Force could, for example, decide to keep tactical planes in service for a longer period than they now plan. Perhaps most importantly, the Air Force could hold down the cost of the MRF. That only seems likely to happen if the Air Force modifies an existing aircraft, presumably the F-16, rather than pursuing what appears to be its current plan to develop an entirely new plane.

Later in this hearing, I think the Air Force witness will argue that they can buy the ATF and the MRF, avoid the need for added funding, and still maintain 26 wings of tactical aircraft in the long term. We think their results are based on a number of favorable assumptions, particularly about the cost of the ATF, and about the cost of the new plane they expect to develop as an MRF.

While the Air Force apparently makes favorable assumptions to argue that it can afford 26 wings in the long term, there are, unfortunately, some unfavorable but plausible assumptions that suggest the service might find it difficult just to keep the 18 wings. Several of those unfavorable assumptions are shown at the bottom part of my chart over here to the left.

For example, at its currently estimated price of $73 million apiece, the cost growth associated with the ATF is low by historical standards, especially for a highly capable plane. If history is a

guide, the ATF could cost $100 million apiece, or even $135 million. In the absence of sharply increased funding, these unfavorable assumptions could lead to an Air Force with 12 to 16 tactical fighter wings in the long run.

Because of the potential for reductions, perhaps drastic reductions, in the long-term size of the tactical Air Force under the administration plan, Congress might want to examine some alternative policies. I will focus on two in my oral presentation.

One alternative would cancel the ATF program and buy only upgraded versions of the F-16. To fill its need for more capable aircraft, the Air Force under this alternative would buy the so-called Falcon-21++, which is a radically modified F-16, that would incorporate many of the improvements now planned for the ATF. The less capable portion of this alternative fleet would consist of Falcon-21 aircraft, an F-16 with more modest modifications. Under this approach, we estimate that the Air Force could maintain between 24 and 26 wings in the long term, depending on the fraction of the force that was made up of the more expensive Falcon-21++.

Compared with the administration plan, this alternative fleet would be less capable. The alternative fleet would, for example, be less able to avoid enemy detectors because the Falcon-21++ would not be as stealthy as the ATF. However, the aircraft in this alternative fleet would be more stealthy than today's planes, and this improvement might be sufficient, particularly if the primary future threat to U.S. security consists of tactical aircraft from nations other than the Soviet Union.

If Congress plans to pursue this option and buy only upgraded versions of the F-16, it could cancel the ATF development program in 1992 and begin development of the Falcon-21++ and the Falcon-21. To maintain a production base, Congress would probably also have to continue buying existing F-16 aircraft at a low rate. Total costs under this alternative in 1992 to 1997 should approximately equal those under the administration plan. The savings from canceling the ATF would pay for the added production of the F-16 and the development costs for the new aircraft.

Under the second of the two alternatives I will discuss, Congress would decide that, because of uncertainty about future threats to U.S. security, it wants to proceed now with full-scale development of the ATF. If enough funds are not available when the time comes to buy the ATF, Congress could elect to purchase only a very few of these highly capable aircraft. These "silver bullets," if you will, would be used against the most capable adversaries. If such a silver bullet force were to consist of a full 26 wings in the long term, then the MRF must not cost too much more than today's F-16. The cost of the MRF is particularly important under this alternative because it would make up most of any fleet. However, as I have said before, a relatively low-cost MRF only seems likely, at least in light of history, if the Air Force modifies an existing aircraft like the F-16 rather than developing an entirely new plane.

To pursue this silver bullet option, Congress would proceed with development of the ATF. Production of existing F-16 aircraft would probably have to continue at a low rate while a modified version of the F-16 is developed as a low-cost MRF. These actions would re-

quire additional funding of about $4.4 billion to pay for the added F-16 aircraft under our particular alternative in 1992 to 1997.

These added costs could be offset by reducing funds for development of the ATF, but that would delay ATF deployment for at least several years. If this delay is unacceptable, Congress could offset the added costs of this option through reductions in other programs in the Air Force or in the other services.

I have covered a lot of information quickly. Let me just conclude by reiterating a few key points. If the United States Air Force pursues its current plan to buy an ATF and to develop a brand-new plane as an MRF, the tactical aircraft program stands a good chance in the long term of either requiring a good deal more money or falling well short of its goal of 26 wings.

If these choices are not acceptable, Congress might want to consider aiternatives. I have mentioned two just a moment ago—buying upgraded F-16s or this silver bullet approach.

Also, key to shaping long-term trends for tactical aircraft is the decision about continuing production of the F-16. If the history of Air Force cost changes is any guide, continued production of F-16s will be necessary if the Air Force is to achieve a relatively low-cost MRF. The Air Force must hold down the costs of the MRF if it is to have a hope of maintaining 26 tactical fighter wings in the next century without substantial increases in funding.

That concludes my oral statement, Mr. Chairman. Ms. Pierrot and I will be glad to answer any questions.

[The prepared statement of Mr. Hale follows:]

PREPARED STATEMENT BY ROBERT F. HALE, ASSISTANT DIRECTOR NATIONAL SECURITY DIVISION, CONGRESSIONAL BUDGET OFFICE

I appreciate the opportunity to testify today about the future of tactical fighter forces in the Air Force. The Department of Defense (DOD) plans to announce, perhaps as early as tomorrow, which of two teams of contractors will develop its newest top-of-the-line fighter aircraft, the Advanced Tactical Fighter (ATF). The Congress will then decide whether the Advanced Tactical Fighter should enter full-scale development, the final stage before production. The Air Force is also beginning development of a Multirole Fighter, a relatively less capable plane that will eventually replace today's F-16 aircraft.

These important decisions will shape the Air Force's stock of tactical fighters for decades to come. Moreover, the decisions must be made during a period of great uncertainty about the future of Soviet military plans as well as uncertainty about limits on our own future defense funding. They will also take place during a period when the number of U.S. tactical fighter forces will undergo major reductions.

Although my testimony today addresses many issues pertaining to Air Force tactical fighters, it focuses primarily on affordability—that is, the ability of the Air Force to meet its numerical needs for aircraft. The testimony reaches three broad conclusions:

— Under the budget plan the administration is proposing, the Air Force should be able to meet its numerical requirements for tactical aircraft through 1999;

— However, a decision to pursue the Advanced Tactical Fighter makes it likely that, starting in the next decade, the Air Force will either fall short of aircraft or will require added funding for tactical aircraft; and

— To minimize long-term problems, the administration should consider buying aircraft other than the Advanced Tactical Fighter or buying fewer of the new fighters; perhaps most important, the administration must limit the costs of the Multirole Fighter.

KEY TYPES OF AIRCRAFT

Air Force tactical fighter forces are designed to destroy enemy aircraft in the air and to attack targets on the ground. Tactical fighters are organized into wings, each of which contains about 72 operational aircraft. Currently, the Air Force has the

equivalent of 35 tactical fighter wings. To accommodate budget constraints and to reflect reduced security threats, DOD plans to reduce that number to about 26 wings by 1995.

Of the seven types of aircraft that make up the Air Force's tactical fighter forces, this testimony focuses on the four that are most important to the debate—two existing aircraft and two new planes.

Existing Aircraft

Two aircraft—the F-15 and the F-16—are the mainstays of today's tactical fighter fleet.

F-15 Eagle. The F-15 Eagle is currently the Air Force's top-of-the-line fighter. Developed in the late 1960s, it first entered production in 1973. To date, a total of 1,074 F-15 aircraft have been purchased.

The F-15 aircraft is a twin-engine, supersonic fighter capable of attacking enemy aircraft that are outside of a pilot's visual range. A variation of the F-15, the F-15E Strike Eagle, has sophisticated capabilities for attacking targets on the ground: advanced avionics, long flight ranges, and substantial capability to attack targets at night and in bad weather.

Because the administration intends to replace the F-15 aircraft with the Advanced Tactical Fighter, it plans no further purchases of F-15 planes. The Strike Eagle, the latest version that was purchased, had an average procurement cost of about $45 million apiece. (All costs in this testimony are expressed in constant 1992 dollars of budget authority.)

F-16 Falcon. Compared with the F-15, the F-16 Falcon is relatively cheaper and less capable. All F-16 aircraft are designed to attack both enemy aircraft in the air and targets on the ground. The F-16 aircraft attacks targets in the air with a short-range missile or a gun, giving it less range than the F-15 in air-to-air combat. The Falcon has less complex avionics, and less sophisticated ground attack capabilities, than those of the Strike Eagle.

The Falcon is also considerably less expensive than the Eagle. The F-16 aircraft costs an average of about $20 million to procure compared with $45 million for the E model of the F-15. Under administration plans, the last F-16 aircraft will be purchased in 1993. By then, about 2,200 Falcon aircraft will have been bought.

New Aircraft

Under the administration's plans, the Air Force tactical fighter fleet will eventually consist primarily of two aircraft: the Advanced Tactical Fighter and the Multirole Fighter.

Advanced Tactical Fighter. The Advanced Tactical Fighter is a new generation of aircraft. The plane is designed to have stealth capability—that is, be very difficult to detect using a variety of sensors including radar and infrared or heat detectors. ATF development will probably emphasize limits on the plane's detectability by radar. To limit detectability by radar, the aircraft would be shaped to direct reflections of radar beams away from enemy radars; the use of special materials and coatings would also limit reflections. Designers will also attempt to limit detectability by infrared sensors by, among other things, decreasing the heat emitted from the plane's engines. Efforts would also be made to limit the plane's own electronic emissions.

The Advanced Tactical Fighter will also have the ability to accelerate to, and cruise at, supersonic speeds without having to rely on the extra power of an afterburner. This capability, which the Air Force terms "supercruise," greatly increases the time the aircraft can fly at supersonic speeds by minimizing reliance on afterburners, which make inefficient use of fuel. The supercruise technology would also help increase the ATF's range and might enable the plane to carry more weapons. Finally, compared with previous generations of aircraft, the Advanced Tactical Fighter will have more highly integrated avionics, thus providing more information and in a manner that reduces the pilot's workload.

Eventually, the Advanced Tactical Fighter will replace the F-15 aircraft as the top-of-the-line fighter designed to attack enemy planes in the air. A variation of the Advanced Tactical Fighter might also eventually replace today's F-15E and F-111 aircraft, which are designed to accomplish long-range bombing missions. Alternatively, these long-range bombers might be replaced with the AX aircraft, an attack plane that the administration will reportedly propose buying for the Navy.

The initial stages of developing the ATF aircraft are largely complete. If the Congress approves, the ATF program will enter full-scale development, the final step before it goes into production in the last quarter of this year. Under current plans, production will begin in 1997. The first operational squadron of ATE aircraft (consisting of 24 planes) would be fielded around the year 2000.

The ATE program would be costly. According to current estimates, funding for development will total $16.1 billion. If the Air Force carries out its current plan to buy 750 Advanced Tactical Fighters, each would cost an average of about $73 million to buy. These estimates of costs for development and procurement have increased over last year's levels by about 16 percent and 17 percent, respectively. Much of this increase probably results from changes that achieve a more gradual pace of development and production than was envisioned a year ago.

The Multirole Fighter. Just this year, the Air Force announced its intention to develop a new Multirole Fighter (MRF), a follow-on to the F-16 aircraft. Presumably, this aircraft would require a number of years to develop and would enter production sometime early in the next century.

Because it is a new program, much less is known about the cost and design of the Multirole Fighter than the Advanced Tactical Fighter. The Air Force, however, probably would want the new plane to have stealth capabilities. In addition, as it has done in the ATE program, the Air Force may wish to incorporate other improvements in capability over the F-16 aircraft, such as increases in range and ability to carry munitions, maneuverability, speed, and accuracy in delivering weapons.

What might a Multirole Fighter cost? An Air Force briefing indicates that the service intends to try to make the Multirole Fighter as affordable as possible. That intention would, however, conflict with the Air Force's desire to achieve improvements in capability. History also suggests that, if the Air Force develops an entirely new plane as its Multirole Fighter, then the plane will cost substantially more than the F-16 aircraft. Since World War II, each new generation of tactical fighter aircraft has cost at least 80 percent more than its predecessor. Indeed, many new generations have cost two to three times more.

Alternatively, the Air Force could create a Multirole Fighter by improving the existing F-16 aircraft. If history is a guide, such an aircraft would be substantially cheaper than an entirely new plane; modifications to existing aircraft have generally not added as much to costs. At the same time, there is a trade-off: a modified F-16 aircraft would have less capability than an entirely new aircraft.

TACTICAL FIGHTERS AND THREATS TO U.S. SECURITY

In deciding whether or not to buy new fighters, and how many to buy, the administration and the Congress must consider the future threats that these aircraft will confront. Unfortunately, the nature of these threats is highly uncertain.

Threats From the Soviet Union

In view of its current state of turmoil, the Soviet Union could remain a major threat to U.S. security. There are cogent arguments on both sides of the issue. But if the Soviet Union were to remain a major threat, the administration argues that it needs the improved capability that the Advanced Tactical Fighter would provide in order to ensure that U.S. aircraft remain superior to those of the Soviet Union. According to the administration, the Soviet Union has deployed three new aircraft—the MiG-31, the MiG-29, and the Su-27—since the United States initially fielded the F-15 aircraft. The administration also expects the Soviet Union to field two new Soviet fighter aircraft early in the next century, though some analysts believe Soviet economic problems may slow or prevent this continued modernization. Finally, the administration has indicated concern about improvements in Soviet air defenses. These improved defenses argue for the stealth capability that the Advanced Tactical Fighter would provide.

Assessments of the capability of tactical air forces bear out concerns about Soviet capability. The Congressional Budget Office assessed the capability of tactical air forces using a scoring method that accounts for both the quantity and quality of aircraft. As of today, a rough parity of capability probably exists between the tactical air forces of the Soviet Union and those of NATO countries. If, however, the United States carries out its planned reduction to 26 wings and the NATO allies make proportional cuts, but the Soviet Union makes no further reductions in its tactical air forces, then the Soviet Union would enjoy an advantage over NATO countries in tactical aircraft scores—perhaps by as much as 1.4 to 1. Even if the Soviet Union eventually complies fully with the limits on aircraft in the treaty limiting Conventional Forces in Europe (CFE), the Soviets might still have an advantage of about 1.2 to 1.[1]

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[1] For a more complete discussion of this topic, see the testimony of Robert F. Hale before the House Committee on Armed Services, March 19, 1991.

Other factors may offset this Soviet advantage. For example, some Soviet aircraft that are included in these comparisons may not be used to oppose NATO forces. Many Soviet aircraft, while capable of opposing allied forces, are intended to defend the Soviet homeland and so might be kept out of any offensive action. Moreover, comparisons of ground forces are more favorable to NATO than those for tactical air forces. Finally, these comparisons are based on measures that account only for the quantity and quality of aircraft. The measures do not reflect any differences in training, logistics support, or other factors, some of which may favor the United States.

Nevertheless, these comparisons suggest that, if the Soviet Union remains a major military foe, one can make a case for maintaining at least the planned number of U.S. forces while also upgrading those forces to match improvements in Soviet capability.

Threats From Other Nations

It is also possible that domestic concerns and economic problems might cause the Soviet Union to direct its attention inward, thus lessening the threat it poses to U.S. interests. This trend would drastically reduce the threats posed to U.S. tactical air forces because the capabilities of potential adversaries other than the Soviet Union are much more modest. Comparisons based on the number and quality of tactical aircraft suggest that the United States enjoys overwhelming advantages in tactical aircraft over a wide range of potential adversaries, such as Cuba, North Korea, and the prewar forces of Iraq. Even after the planned reduction in U.S. forces to 26 wings, the U.S. advantage would range from a low of 4 to 1 to a high of 16 to 1.

Moreover, other factors not captured in these numbers may favor U.S. tactical air forces in conflicts against nations other than the Soviet Union. Air defenses in other nations are less capable. U.S. military personnel are almost certainly better trained than those in most other nations. Moreover, at least when inexperienced hands operate Soviet weapons, recent experience in the Persian Gulf suggests that their capability is less than what the administration would have predicted.

Thus, against nations other than the Soviet Union, the United States might not need the major improvements in capability that the Advanced Tactical Fighter or a substantially more capable Multirole Fighter would provide. Indeed, some military analysts would argue that, if the Soviet Union is not the key threat, the Air Force needs to focus on enhancing its ability to attack ground targets rather than buying an Advanced Tactical Fighter that is designed primarily to attack enemy aircraft.

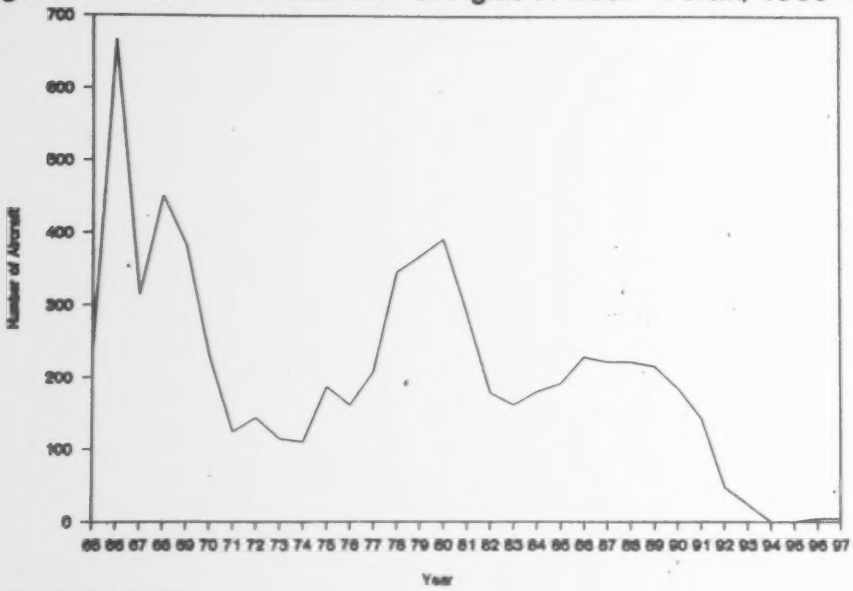
After assessing likely future threats, the administration has apparently decided to purchase more capable aircraft while also attempting to maintain 26 air wings in the years beyond 1995. The administration should have no trouble maintaining its desired force level in the 1990s, but the outlook is much less rosy in the longer term.

MEETING NUMERICAL REQUIREMENTS FOR 1992–1999

In 1992 through 1997, the administration plans to buy only 72 F-16 aircraft and 8 Advanced Tactical Fighters. This level of procurement--averaging 13 planes a year—is extremely low by historical standards and well below the 150 aircraft that the Air Force believes are needed to sustain the fleet (see Figure 1). Funding for procuring new aircraft should total roughly $4.5 billion.[2]

[2] Data publicly available on the administration's plans do not include procurement costs for the Advanced Tactical Fighters. The Congressional Budget Office used Air Force data to produce a phased estimate of those costs.

Figure 1. Air Force Procurement of Fighter/Attack Aircraft, 1965–1997



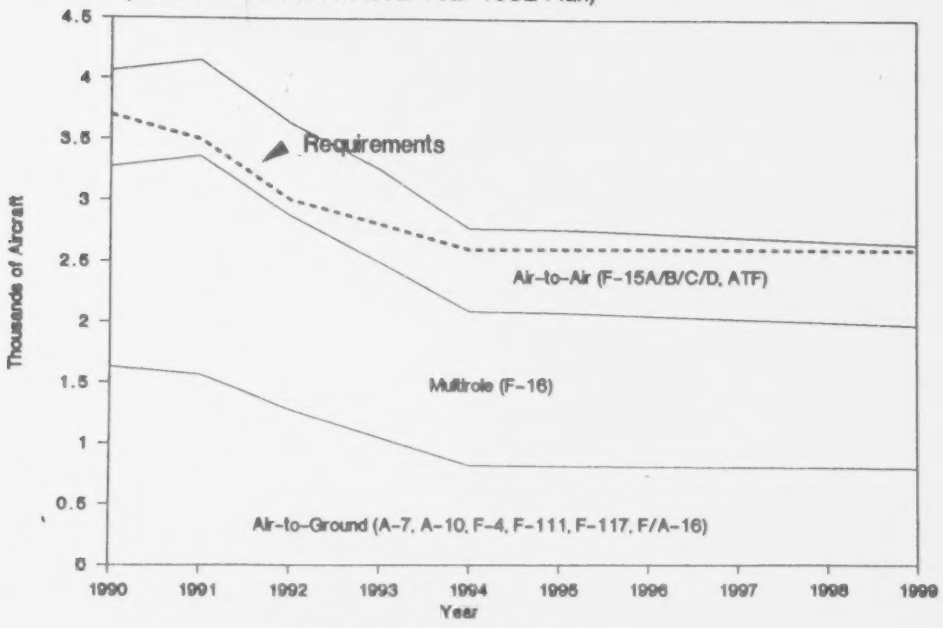
SOURCE: Congressional Budget Office.

The administration does plan substantial funding to develop new aircraft between 1992 and 1997. Development for the ATF would receive a total of $10.1 billion in 1992 dollars. Development of the Multirole Fighter would absorb $0.5 billion.

Inventories and Requirements

Making the reduction from 35 wings to 26 wings should offset planned low rates of procurement. Thus, the Air Force should easily meet its numerical requirements for tactical aircraft through 1999, the first year when all aircraft purchased between 1992 and 1997 will be in the fleet (see Figure 2).

Figure 2. Requirements and Inventories for Air Force Tactical Fighter Wings (The Administration's Fiscal Year 1992 Plan)



SOURCE: Congressional Budget Office based on Air Force data.
NOTE: Excludes fighter interceptor squadrons and other fighter requirements.

Requirements for tactical aircraft fall sharply during this period, from about 3,700 aircraft in 1990 to about 2,600 aircraft by 1994. They would presumably remain at the level of 2,600 through 1999. To accommodate these sharply reduced requirements, the Air Force will actually have to retire a number of aircraft before they reach the end of their service lives—defined as the time the aircraft suffer structural fatigue. During the period from 1992 to 1994, if decreases in aircraft inventories are consistent with planned force reductions, about 1,600 aircraft will be retired. Yet only about 150 of these aircraft would have reached the end of their service lives during this period. These early retirements mean that, during the remainder of the 1990s, few retirements would be dictated by service lives, which average 28 years for the various types of aircraft in the fleet today.

The Congressional Budget Office's estimates of aircraft requirements are based on Air Force estimates that about 100 planes are needed to maintain one wing (72 operational aircraft are required for a wing in addition to other aircraft that are involved in overhaul, training, and other uses). Requirements in 1994 and later years assume that the Air Force maintains 26 wings. Requirements for certain types of tactical aircraft, such as fighter interceptors, are not included in the Congressional Budget Office's estimates because of uncertainty about the size of future requirements.

Average Age

The Air Force would not only meet its numerical goals for aircraft through 1999; it would also meet its goal for average aircraft age, at least through 1997. The service goal—to retire aircraft after 22 years of service and so maintain a fleet that on average is no more than 11 years old—calls for retirement before the end of the plane's service life, which is dictated by structural fatigue. The Air Force seeks to retire aircraft before they wear out because the service believes that retaining aircraft much longer than 22 years would cause planes to be less modern than the aircraft they might have to fight. As the service terms it, an older fleet would be "obsolescent in the face of the threat."

Assuming the administration's planned buys of aircraft, and the Congressional Budget Office's estimate of the number of retirements, the average age of the Air Force's inventory of tactical aircraft declines through 1994—from about 10 years in 1991 to less than 9 years in 1994—reflecting the retirement of older aircraft (see

Figure A-1 in the Appendix to this testimony). Average age then rises sharply during all the remaining years through 1999.

Despite this increase, average age exceeds the Air Force's goal of 11 years only slightly in 1997. By 1999, however, average age reaches more than 13 years, 2 years above the Air Force goal. This aging fleet suggests a problem that is captured more fully in the Congressional Budget Office's analysis of the long-term outlook for meeting numerical aircraft requirements.

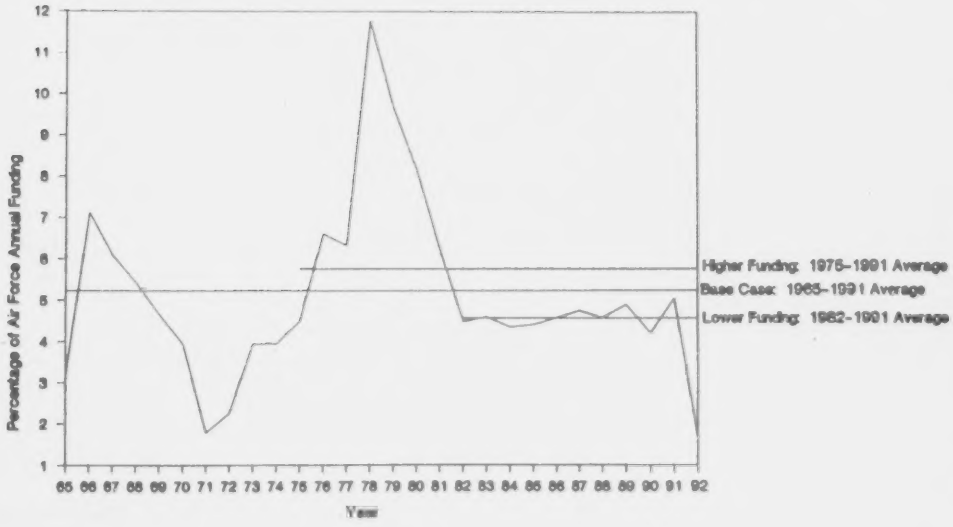
MEETING NUMERICAL REQUIREMENTS IN THE LONG TERM

The administration will have difficulty maintaining a force of 26 wings in the long term. Two factors have the greatest influence on the long-term size of inventories of tactical aircraft: how much money the service can spend on the planes and how much each plane costs.

Available Levels of Funding

It is impossible to know for sure how much funding will be available to buy tactical aircraft in the next century. To illustrate a possible level of funding consistent with past history, the Congressional Budget Office calculated a base-case estimate assuming that tactical aircraft receive the same average share of total Air Force funding (5.2 percent) as they received in the years since 1965. This average includes two periods when tactical aircraft received a larger than average share of the Air Force budget and one period when the aircraft received a below-average share (see Figure 3). We applied the 5.2 percent to administration estimates of available Air Force funding in 1995, the year when all the budgetary reductions required under the Budget Enforcement Act of 1990 will be carried out. The resulting level of available funding ($4.3 billion) is about six times the average level of funding that the administration plans to devote to buying new tactical fighters during the years from 1992 through 1997.

Figure 3. Percentage of Air Force Budgets for Procurement of Fighter/Attack Aircraft, 1965-1992

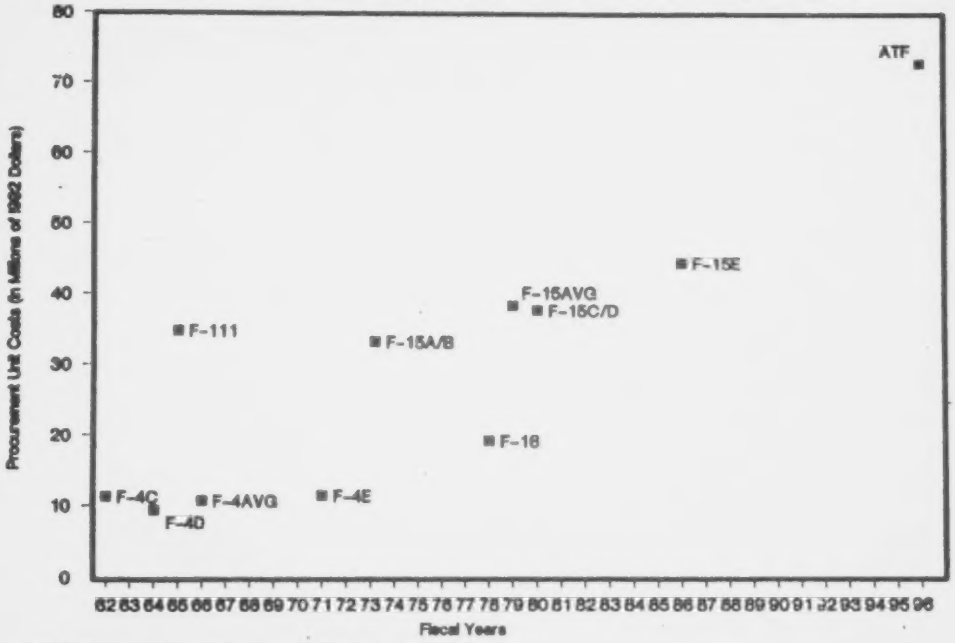


SOURCE: Congressional Budget Office from historical budget and Air Force data.

Aircraft Costs

Aircraft costs are also important in estimating how many tactical aircraft the Air Force can maintain over the long term. For its base-case estimate, the Congressional Budget Office used the Air Force's current estimate for the average cost to procure an Advanced Tactical Fighter—about $73 million. At this price, the Advanced Tactical Fighter would cost substantially more than most other Air Force tactical fighters (see Figure 4).

Figure 4. Aircraft Procurement Unit Costs Versus First Procurement Year



SOURCE: Congressional Budget Office based on Air Force data.
NOTE: Program averages plotted at rough midpoint of program.

No Air Force estimate is available for the cost of the Multirole Fighter. In its base case, the Congressional Budget Office assumes that each Multirole Fighter would cost about $35 million. Because the administration plans to end production of the F-16 aircraft, the Congressional Budget Office assumed that the Multirole Fighter would be an entirely new aircraft rather than a derivative of the F-16 aircraft. We arrived at our estimate of $35 million by increasing current F-16 costs by 80 percent, the least amount of growth experienced at any time since 1950 when moving from one generation of aircraft to the next.

Other Assumptions

In its base case, the Congressional Budget Office also made other assumptions that are key to estimating long-term inventories. To be consistent with Air Force plans and goals, we assumed that about 21 percent of future forces are made up of Advanced Tactical Fighters. Another 12 percent of the inventory, which consists of long-range bombers, is assumed to consist of a plane costing the same as the Advanced Tactical Fighter. Thus, about 33 percent of future tactical forces are assumed to be made up of highly capable aircraft; the remaining force is composed of Multirole Fighters. Consistent with the Air Force goal, tactical aircraft are assumed to remain in service for 22 years. Annual losses from peacetime accidents (attrition) are assumed to amount to about 1 percent a year.

Based on these assumptions, the Congressional Budget Office estimated the number of wings that the Air Force would be able to maintain in the year 2025. While few reading or listening to this testimony will be concerned with Air Force tactical aircraft by the year 2025, keep in mind that it is the first year when the choices discussed in this testimony today will determine all of the aircraft in the Air Force inventory. Indeed, their impact may be felt sooner, perhaps by the end of the next decade.

Shortfalls Under Long-Term Projections

If funding levels and aircraft prices remain at the levels the Congressional Budget Office assumed in its base case, then the Air Force would be able to maintain only about 18 wings of tactical aircraft in the long term (see Table 1). This level would be about 8 fewer wings than the Air Force plans to have in 1995 and 17 fewer wings than it has now. Clearly, at the prices the Air Force may have to pay for future

tactical aircraft, historical budget shares applied to a constant total Air Force budget do not provide enough funds to equip 26 wings.

TABLE 1. AVAILABLE WINGS UNDER VARIOUS ASSUMPTIONS

Assumptions	Available Wings in 2025
Base Case	18
More Favorable Assumptions	
Base Case but Share of Funds Grows[a]	20
Base Case but Average Age at Retirement Is 28 Years	22
Base Case but Multirole Fighter Costs Less[b]	21
Base Case but Air Force Accepts Smaller Share of Most Capable Planes	20
Less Favorable Assumptions	
Base Case but Share of Funds Declines[c]	16
Base Case but ATF Costs More[d]	15
Base Case but ATF Costs Substantially More[e]	12

SOURCE: Congressional Budget Office.

a. Average 1975 to 1991 share.
b. Approximate contractor estimate ($25 million).
c. Average 1982 to 1991 share.
d. F-15 A/B models to F-4 ($100 million).
e. F-15 (all models) to F-4 ($135 million).

Increased Funding. Of course, it is possible that the Air Force will get more money. Sustained real growth of about 2 percent a year above the 1995 level of funding for tactical aircraft would permit the Air Force to maintain 26 wings if all the other assumptions in the base case remain unchanged.

While this annual growth may seem modest, the growth in actual dollars is substantial. Annual growth of 2 percent a year implies an increase of about 45 percent in average funding for tactical aircraft during the next several decades from $4.3 billion to about $6.3 billion. It may be risky to assume any sustained growth in defense budgets, particularly in a period when threats to U.S. security have declined and may continue to decline.

More Favorable Assumptions. Even if the whole Air Force budget does not increase, tactical fighter aircraft might receive a larger share of the Air Force budget. If the long-term share grew to 5.8 percent (the average for the years 1975 to 1991), rather than the 5.2 percent assumed in the base case, then the Air Force could maintain 20 wings over the long run (see Table 1). If funds do not grow, but the Air Force keeps planes until they wear out at about 28 years rather than replacing aircraft after 22 years to maintain a modern fleet, then the service could maintain 22 wings.

The Air Force might also hold down the cost of the Multirole Fighter below levels assumed in the base case. The base case assumes that an entirely new aircraft is designed as a Multirole Fighter. The Air Force could modify existing F-16 aircraft rather than developing a new plane. Estimates by the contractor suggest that one

plausible set of modifications to the F-16 aircraft, including a change to the shape of the wings to hold more fuel and modest improvements to the engine, might increase its cost to around $25 million. If this modified F-16 aircraft—designated the Falcon-21 by the contractor who builds F-16 planes—becomes the Multirole Fighter and costs only $25 million apiece, then the Air Force could maintain 21 wings over the long term.

The Air Force could also purchase less expensive planes for its long-range bombing mission, or simply decrease the number of more capable planes it has in its inventory. If the share of tactical forces made up of the most capable planes fell to 21 percent, the Air Force could maintain about 20 wings in its future forces.

Unfavorable Assumptions. Unfortunately, while some favorable assumptions suggest less of a problem, one can also point to unfavorable ones that may be just as plausible. In future years, the Air Force may be investing heavily in satellites and other space-based assets. Tactical aircraft could receive a smaller share of the Air Force's budget, perhaps only 4.6 percent (the average for the years 1982 to 1991) rather than the level of 5.2 percent assumed under the base case. With a smaller share of the budget, the Air Force can maintain only 16 wings in the long term (see Table 1).

The number of wings the Air Force could maintain would also fall if the costs of the Advanced Tactical Fighter increase above planned levels. It would be prudent to assume some cost growth for several reasons. Estimated costs have increased in the last year. Also, the cost growth of the Advanced Tactical Fighter is low by historical standards.

At its currently estimated price of $73 million apiece, the Advanced Tactical Fighter will cost 90 percent more than the average cost of all the versions of the F-15 aircraft (see Table A-1 in the Appendix). In several cases since 1950, however, the percentage increases in costs associated with shifting from one generation of aircraft to the next have been much larger than 90 percent. If the cost of the Advanced Tactical Fighter grows to about $100 million apiece (consistent with the growth in cost experienced between the A/B version of the F-15 aircraft and its predecessor the F-4), then the Air Force would be able to maintain only 15 wings in the long term. If the Advanced Tactical Fighter eventually costs about $135 million apiece (matching growth in cost between the average version of the F-15 aircraft and the F-4), the Air Force would be able to maintain only 12 wings.

26 Wings: A Risky Bet

In sum, in order to maintain 26 wings over the long run, the Air Force would have to achieve sustained increases in funding for tactical aircraft. Alternatively, it would have to realize a combination of the favorable assumptions that the testimony discusses—for example, extending service lives to 28 years and holding down the cost of the Multirole Fighter—and hope that their benefits are not offset by other, unfavorable assumptions.

Perhaps as likely as these favorable outcomes are unfavorable events that could produce a drastic reduction in the size of the tactical Air Force. Assume, for example, that tactical aircraft receive a smaller share of the Air Force budget or that they maintain their share while the entire Air Force budget continues to decline in the years beyond 1995. If this outcome is combined with substantial increases in the costs of the Advanced Tactical Fighter (to a level of $135 million apiece), the Air Force would be able to maintain only about 11 wings. Such a small fleet of tactical aircraft—less than one-third the size of today's fleet—would probably be unable to carry out future missions such as those required in the Persian Gulf war.

SOLUTIONS THAT MEET LONG-TERM NUMERICAL REQUIREMENTS

Because of the potential for reductions, perhaps drastic reductions, in the long-term size of the tactical Air Force, the Congress might want to examine alternative policies. The alternatives in this testimony are designed to permit the administration to maintain approximately 26 wings without increases in funding. The alternatives would also minimize reductions in the number of Air Force wings in the event of unfavorable trends in funding or the cost of new aircraft.

Continue Producing Current Fighters

The Air Force could forgo producing the Advanced Tactical Fighter and instead continue to produce F-15 and F-16 aircraft. This approach would have important effects in the long run as well as the near term.

Long-Term Effects. In the long term, this approach would permit the Air Force to maintain about 26 wings of tactical aircraft. This result assumes that about one-third of the 26 wings are F-15 aircraft (for the sake of making its estimates, the

Congressional Budget Office assumed that the new F-15 aircraft costs about $50 million, modestly more than today's Strike Eagle version). The other two-thirds of the fleet are assumed to be modestly improved versions of the F-16 aircraft (the Falcon-21) that cost about $25 million apiece.

Such a force would not have as much stealth capability as the fleet of tactical aircraft that the Air Force plans. Nor would a combination of F-15 and improved F-16 aircraft have the same avionics and other capability that would be inherent in a fleet containing Advanced Tactical Fighters. Finally, the F-15 fleet, especially those aircraft produced in 1973, may have come close to exhausting its potential for further improvements in capability.

On the other hand, a fleet of F-15 and F-16 aircraft might make sense if the Soviet Union was no longer a major threat to U.S. security or if Soviet economic woes make extensive modernization of its fighter aircraft unlikely. Moreover, modified versions of current fighters may well be adequate to handle air threats posed by nations other than the Soviet Union. Because it buys more of the F-15E Strike Eagle, this approach would also permit the Air Force to replace its aging fleet of F-111 long-range bombers, thus preserving a capability that could be especially important in conflicts against nations other than the Soviet Union. Finally, in contrast to the administration's program, this approach would keep production lines for Air Force fighter aircraft open in 1994 and 1995.

Near-Term Changes. Pursuing this approach would require important changes in the administration's plan for tactical aircraft in 1992-1997. Under this approach, the ATF program would have to be ended in 1992. A program to make modest modifications in the F-16 aircraft would be instituted at a cost in the 1992-1997 period approximately equal to what the administration planned to spend to develop a new aircraft as the Multirole Fighter. In addition, procurement of both F-15E and F-16 aircraft would continue at low levels, resulting in the purchase of an additional 72 F-15E aircraft and 96 F-16 aircraft during the period from 1992 to 1997. (Table 2 summarizes these changes.)

TABLE 2. NEAR-TERM CHANGES UNDER ALTERNATIVES COMPARED WITH THE ADMINISTRATION'S PLAN

Alternatives	Additional Aircraft Purchased in 1992-1997		Savings/Costs (-/+) (In billions of 1992 dollars)		
	F-15	F-16	1992	1993	1992-1997
Continue Procuring Current Fighters	72	96	-0.4	-0.8	-0.3
Buy Only Upgraded Versions of F-16 Aircraft	0	104	-0.5	-0.6	0.6
Silver Bullet Force with Low-Cost Multirole Fighters[a]	0	96	0.0	0.1	4.4

SOURCE: Congressional Budget Office estimates.

a. Additional funds needed if Advanced Tactical Fighter program continues on schedule.

Compared with the administration's plan, this approach should require almost the same amount of total funding during the 1992–1997 period. The savings from canceling the ATF program offset the added costs of buying small numbers of additional F–15E and F–16 aircraft, producing total savings of $0.3 billion over the period. Savings in 1992 and 1993, totaling about $1.2 billion, are partially offset by added costs of about $0.9 billion in the last 4 years of the plan.

Buy Only Upgraded Versions of the F–16

A second approach would again cancel the ATF program but would incorporate many of the technological improvements developed for the ATF aircraft into some F–16 aircraft. These radically modified F–16 aircraft, designated by the contractors as the Falcon–21 + +, would include the new engine and avionics package intended for the Advanced Tactical Fighter as well as other improvements. The Falcon–21 + + would, of course, cost significantly more than an existing F–16 aircraft—perhaps as much as 70 percent of the Air Force estimate of the cost of the Advanced Tactical Fighter, or about $50 million apiece. This option also assumes that the Air Force buys a plane (perhaps a variation of the Falcon–21 + + or the Navy's AX aircraft) costing the same as the Advanced Tactical Fighter for its new long-range bomber.

Long-Term Effects. In the long run, the Air Force could maintain a fleet of 24 wings to 26 wings under this option. The Air Force could maintain 24 wings if about 21 percent of those wings are Falcon–21 + + aircraft, 12 percent (those used as long-range bombers) have a cost comparable to that of the Advanced Tactical Fighter, and the other 67 percent consist of less extensively modified F–16 aircraft (the Falcon–21). To maintain 26 wings under this approach, the Air Force would have to accept a force in which a smaller fraction, about one-quarter, consists of the expensive types of aircraft— either the Falcon–21 + + or a new long-range bomber.

This approach would reduce the capability of a future fleet, including its capability to evade enemy detectors. Details about the degree of stealth and performance of planned aircraft are highly classified. However, the Falcon–21 + + aircraft would not have as much stealth capability as the Advanced Tactical Fighter. The shape and other design features of an aircraft determine its degree of stealth, and these features can be modified more extensively on new aircraft than on an existing ones. Nor, in all likelihood, would all the aircraft in this alternative fleet have the range of a fleet that included Advanced Tactical Fighters.

This alternative fleet would, however, possess substantially more stealth capability than the Air Force's current fleet of tactical aircraft. This improvement might be acceptable if the primary threat to U.S. security consists of tactical aircraft from nations other than the Soviet Union. Moreover, this approach includes funds for development of the advanced engines and avionics that would be used on the Advanced Tactical Fighter, which provides a hedge against Soviet advances.

Near-Term Changes. Like the previous approach, this one would require cancellation of the ATF development program in 1992. In its place, the administration would pursue development of the Falcon–21 + +, the radical improvement to the F–16 aircraft, and the Falcon–21, the more modest F–16 enhancement. This alternative would also continue purchases of an additional 104 F–16 aircraft of various versions.

Total costs under this alternative in 1992 to 1997 should approximately equal those of the administration's plan, requiring added costs of perhaps $0.6 billion over the 6 years. Modest annual near-term savings of about $0.5 billion in 1992 and 1993 would be offset by costs of $1.7 billion in the remaining 4 years of the plan. Costs in 1992–1997 would be lower and savings higher if production of the existing F–16 aircraft were ended while the Falcon–21 + + is being developed.

Silver Bullet Force With Low-Cost Multirole Fighters

The Congress could decide that, because of uncertainty about future threats, it wants to proceed now with full-scale development of the Advanced Tactical Fighter. If increased funds are not available when the time comes to buy the Advanced Tactical Fighter, the Congress could elect to buy only a very few of these highly capable fighters. This small force of the most capable fighters—"silver bullets"—would be used against the most capable adversaries.

Long-Term Effects. If such a silver bullet force is to consist of a full 26 wings, then the Multirole Fighter must not cost too much more than today's F–16 aircraft. The cost of the Multirole Fighter is particularly important under this approach because the plane would make up most of the fleet. Assume, for example, that only 10 percent of the future fleet of tactical fighters and long-range bombers consists of Advanced Tactical Fighters. The other 90 percent consists of modified versions of the F–16 (the Falcon–21), which cost about $25 million apiece. Under these assumptions,

the Air Force could, over the long run, maintain a fleet of 26 wings. (The estimate of 26 wings assumes that the cost of the Advanced Tactical Fighter grows from the current Air Force estimate of $73 million to about $100 million apiece because of the higher costs associated with a small buy of the planes.)

Thus, under this approach, the Air Force could maintain its planned size of 26 wings. The approach should also minimize the chances of a drastic decline in the size of the Air Force in the event of unfavorable trends in funding or ATF costs. Moreover, this approach creates an open production line for Advanced Tactical Fighters that could be used to produce more of these capable fighters in the event that threats to U.S. security demand more capability.

Would such a silver bullet force meet security needs? Perhaps, particularly if threats to U.S. security stem primarily from countries other than the Soviet Union. Indeed, this approach would mirror the current situation with the F-117 aircraft. The Air Force has only a small fleet of these fighters with stealth capability. Yet it used them with great success to attack targets in the Persian Gulf that might have been difficult to destroy with aircraft having less stealth capability.

The benefits of this approach will be fully realized, however, only if the cost of the Multirole Fighter is held down—under the Congressional Budget Office's assumptions to around $25 million apiece. If the cost of this aircraft grows, the number of Air Force wings would shrink well below 26, even if the number of highly capable aircraft is limited. The history of growth in costs suggests that a Multirole Fighter costing $25 million apiece is only likely to be realized if it is a derivative of an existing plane—presumably, in this case, the F-16. The development of an entirely new aircraft, as the Air Force apparently plans, has in the past always resulted in much larger increases in cost.

Near-Term Changes. Thus, if the Congress wants to maintain the option of pursuing this approach, it would probably have to continue production of the existing F-16 aircraft and develop a modestly modified version of the F-16 as a low-cost Multirole Fighter. Continuing purchases of F-16 aircraft at annual rates of 24 aircraft in 1994 through 1997 would result in the purchase of 96 additional F-16 aircraft compared with the administration's plans. Added funds of about $4.4 billion in 1992-1997 would be needed to pay for these extra planes.

To offset these added costs, the Congress could reduce funding for the ATF development program. If cuts in ATF development funds must fully offset the added costs, then total ATF funds in the years 1992 to 1997 would have to be reduced by about 35 percent. Funding reductions to the program would be much higher than that in later years of the period, up to about 50 percent in 1995 through 1997.

This funding cut would delay ATF deployment for at least several years. Such a delay may be reasonable in view of uncertainty about the nature of future Soviet threats. Indeed, a delay would provide time to ascertain how that threat is developing. A delay would, however, extend a development program that is already long by historical standards and would add to the total cost of developing the Advanced Tactical Fighter. Thus, the Congress could decide to maintain the pace of the ATF development program and offset the added costs of this option through reductions in the other programs of the Air Force or the other services.

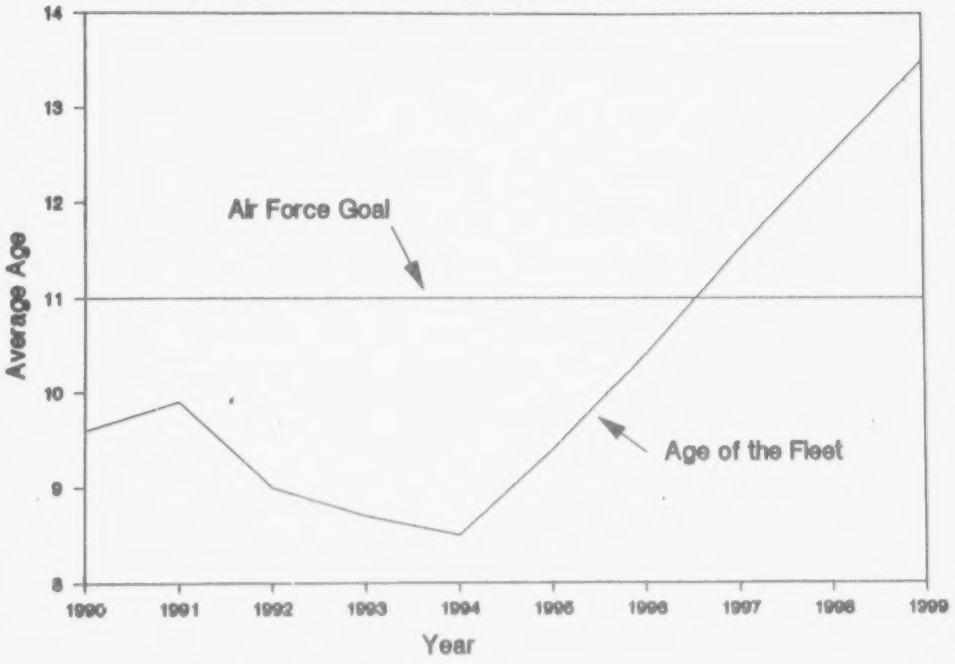
CONCLUSION

If the Air Force pursues its current plan to develop and buy an Advanced Tactical Fighter and a new Multirole Fighter, the tactical aircraft program stands a good chance of eventually either requiring sustained increases in funding or falling well short of maintaining the 26 wings now planned. Although these problems will not be evident until the next century, the decision the Congress will make this year about the Advanced Tactical Fighter will be important in shaping the long-term outlook. Because of the importance of this decision, the Congress may wish to consider alternatives such as a small, silver bullet force of Advanced Tactical Fighters or the purchase of upgraded versions of the F-16 aircraft.

Also key to shaping long-term trends for tactical aircraft is the decision that the administration and the Congress will make in the next several years regarding continued production of the F-16 aircraft. If the history of aircraft cost changes is a guide, continued production of F-16 planes will be necessary if the Air Force is to achieve a relatively low-cost Multirole Fighter. The administration must hold down the costs of the Multirole Fighter if it hopes to maintain 26 Air Force tactical fighter wings in the next century without substantial increases in funding.

APPENDIX A. FIGURE AND TABLE

Figure A-1. Average Age of Tactical Aircraft, 1990–1999 (Administration's Fiscal Year 1992 Plan)



SOURCE: Congressional Budget Office based on Air Force data.

TABLE A-1. RATIOS OF AIRCRAFT COSTS

Aircraft	Percentage Growth in Unit Costs
ATF (Using Current Air Force Estimate) to F-15 Average[a]	90
F-16 Average to F-4 Average[a]	80
F-4C to F-100[bc]	80
F-111 to F-105[b]	190
F-15A/B to F-4 Average[a]	205
F-15 Average to F-4 Average[a]	260

SOURCE: Congressional Budget Office estimates.

a. Compares procurement unit costs in 1992 dollars.

b. Compares flyaway costs in 1992 dollars.

c. Some analysts argue the F-86 is a more appropriate choice for the F-4's predecessor. The F-4's costs were 400 percent higher than the F-86.

Senator LEVIN. Thank you, Mr. Hale. Under your second alternative, you indicated we would have to find $4 billion somewhere, and that there would be a slow-down of the ATF development. What would that add to the cost per plane on the ATF?

Mr. HALE. I do not have a precise estimate, Mr. Chairman. It would certainly add to the total development costs in real dollars because you would be having to keep the team together over a longer period of time to do the same amount of work. In real dollars, the second alternative might not add to total procurement costs, though I do not have a specific estimate.

Senator LEVIN. Would you be able to give us some estimate of the cost?

Mr. HALE. We might be able to work with the Air Force on the development side. Let us see if we can do that for you. I do not have any number, but it certainly would add to it.

Senator LEVIN. How much of a slow-down are you talking about under your alternatives?

Mr. HALE. If the ATF program were to absorb all the reductions, all the $4 billion, ATF funding would have to be reduced by 35 percent over the whole period—more in some, less in other years. So I think you are talking about a couple of years, conceivably, in delay.

You might want to address that question to General Ralston later. He may have a better feel.

Senator LEVIN. You say that the Falcon—is it 21++?

Mr. HALE. Plus plus, right.

Senator LEVIN. How would you assess its capabilities compared to the ATF? Would you give it a 60 percent, 70 percent?

Mr. HALE. I cannot give you a number. It is certainly a good deal more capable than today's F-16. I mean, it would have the avionics and the engine planned for the ATF, though it would clearly be less capable than an ATF. In particular, because it would use pretty much the existing air frame, it would obviously be less stealthy than would an ATF. I think the Air Force has tried to evaluate the capability in more quantitative terms using some of their models, and they might be able to be helpful in answering questions.

Senator LEVIN. Are you familiar with their assessment?

Mr. HALE. Not in detail. According to their statement, and they have said to us that it is significantly less capable. But no, I am not familiar with the details of their assessment.

Senator LEVIN. You indicated that the Air Force's assumptions lead them to a 26-wing conclusion, I believe. You call them favorable assumptions, I think.

Mr. HALE. Favorable, right.

Senator LEVIN. In your view, are those assumptions of the Air Force optimistic assumptions?

Mr. HALE. Yes. I think they are optimistic, though I might stop short of saying wildly optimistic. A key assumption is that they assume that this MRF, the follow-on to the F-16, does not cost much more than today's F-16. That is their goal, and I hope they can stick with it. However, history is not reassuring that they will be able to achieve that goal if they develop a brand-new plane. That is a key favorable assumption.

I think they are also certainly assuming no growth in the costs of the ATF. Indeed, they may be assuming costs that are modestly less than the price stated in current Air Force plans. They may also be assuming, as best we can tell, slightly more funding than would be suggested by the historical period the Congressional Budget Office used in its analysis. But their assumptions are not wildly optimistic. I would just say, optimistic.

Senator LEVIN. Optimistic. What was the percentage increase that they assumed for their MRF over the F-16?

Mr. HALE. I think they are assuming an F-16 today in a high-rate buy would cost around $20 million. I believe they are assuming something like $25 million for the follow-on, the MRFs, roughly. So we are talking 25 percent or so.

Senator LEVIN. That is in today's dollars, $20 million and $25 million?

Mr. HALE. Yes.

Senator LEVIN. And you are saying history has seen about an 80 percent increase in real dollars?

Mr. HALE. In going from one generation to the next—in other words, developing an entirely new aircraft. Since World War II, the smallest growth has been about 80 percent. So if they develop a

new plane, they are going to have to repeal history to keep the growth to 20 or 25 percent.

Senator LEVIN. In order to use the F-16, assuming we wanted to do that, as the base for the MRF, we would have to keep that production going. Is that true?

Mr. HALE. I would think so. Ms. Pierrot and I have had some informal discussions with the Air Force and the contractor about whether you could have a production break. It is possible that, even without any buys by the U.S. Government, the line would stay open. The United States does have the possibility of foreign military sales. Certainly the South Korea sale is a possibility—more than a possibility. It is going to occur. Moreover, if the company knew that they were going to be producing another plane, then maybe they could keep their subcontractors together. But I would assume that, to have confidence that the line will be open, you might have to continue U.S. buys at a low rate.

Senator LEVIN. If we were the only buyer—there were no FMS, and we had to buy, say, at a low rate for 5 years, in order to keep that option open for the multirole follow-on, what would that cost? The lowest reasonable buy, and the 5-year buy?

Mr. HALE. I am not sure the company would agree with this, but in our testimony we assumed a buy of 24 aircraft a year in the years beyond 1993. The Air Force is planning to buy F-16s in 1992 and 1993. So our assumption added 96 more F-16s over the 4 years 1994, 1995, 1996, and 1997 of this new 6-year plan, and added about 4.4 billion, which is a lot of money.

We were not able to get estimates of the added costs from either the contractor or the Air Force, so we used the Congressional Budget Office models that estimate how much it costs if you reduce the rate of buy to a very low level—we have never bought F-16s at that level before—and came up with a number of $4.4 billion in today's dollars.

Senator LEVIN. What was that—4 years at how many per year?

Mr. HALE. 4 years at 24 a year, so I would say that is quite a low buy.

Senator LEVIN. My last question, because my time is up, if we did that, and if we use the option of the F-16 follow-on for our multirole follow-on, what would that existence of a base save us over an assumption where there were no base at all? It is going to cost us $4.4 billion, let us say, in planes that we otherwise might not order. What would it save us in terms of the cost of the F-16 follow-on, assuming that that were the multirole follow-on?

Mr. HALE. No—I cannot give you a definite answer to that. Under our assumptions, if they develop a new plane and experience the least amount of cost growth they have ever experienced since World War II, they get up to $35 million apiece for the MRF. This compares with perhaps $25 million if the Air Force could buy a more modestly modified Falcon-21. So you are talking $10 million apiece. The United States could easily buy several thousand of these over a long period of time, Mr. Chairman, so the savings are potentially quite large.

Now, I have to be fair. I think a modestly modified F-16 would probably be less capable than a brand-new plane, as well. These

are not equal capability options we are presenting you, but the savings could be quite large over a substantial period of time.

Senator LEVIN. I will have to come back to that because my time is up. Senator Wallop?

Mr. HALE. Can I add one thought to that?

Senator LEVIN. Sure.

Mr. HALE. That is, you do face a dilemma, though. They do not need the planes. I mean, through the 1990s the United States said we have plenty of planes. So the United States would be buying existing F-16s that will not be needed for a number of years in a period when it is hard to defend defense dollars. It is a dilemma.

Senator LEVIN. Thank you. Senator Wallop?

Senator WALLOP. Thank you, Mr. Chairman. That dilemma sort of persists throughout all of these comparisons.

Mr. HALE. Yes, sir.

Senator WALLOP. I get very uncomfortable with the assumption that—though based on history, that the new airplane would be—completely new airplane growth cost of 20 to 25 percent, but that does not say anything about growth in capability in that 25 percent, which I think—I do not know how you measure it, but it has been substantial, each new airplane we have gotten. So what assumptions do you make about that, or is that just—is it an accountant's dream, or is it a strategist's dream?

Mr. HALE. No, it is not an accountant's dream, and it is a fair question to ask. The first thing I should say is that we are not attempting to provide a definite answer. We are not suggesting that one approach or another is the most cost-effective.

It seems to me that the different alternatives are consistent with varying judgments about threats to U.S. security. If you think that the Soviet Union is going to invest substantially in two more versions of tactical fighters—as the Air Force has said they believe will happen in the rest of this decade, and that they will be selling those planes around the world—you may well want to proceed with a substantial modernization program, realizing that to keep 26 wings you are going to have to come up with a fair bit more money—a couple of billion dollars a year, on average—for tactical aircraft alone in the Air Force over the next several decades.

On the other hand, if you think that this arms race may slow down, which I think we would all hope, but if you judge that that is likely, it might be quite reasonable to have a plane that is not much more capable than today's F-16. It would be cheaper, or at least would allow us to maintain numbers and—to quote that old phrase—quantity does at some point have a quality all its own. So I would not present one alternative as the most effective. I would present the approaches as consistent with different judgments about where the United States is heading in terms of threats to its security.

Senator WALLOP. I cannot remember the name of the professor at Yale who made the argument in the 1950s that technology was a surrogate for war, that as people advanced their technologies and responded to the other's advances in technologies, that is what they were doing. But when they stopped advancing technologies, started buying numbers, was usually when the threats became the most irresistible, or the most difficult to control. I think history

tells us a lot of that. Surely the technological advances that were demonstrated in the Gulf were a cost benefit, even though they were never measured in advance in the decision-making process. Would you not agree with that?

Mr. HALE. Yes. The U.S. technological superiority was clearly a major advantage.

Senator WALLOP. One of the things that bothers me as we wrestle with these decisions is, how do you come to grips with the fact that in a declining base, you are going to necessarily have increasing unit costs from everything from steel spoons right up to tactical fighters? I mean, that is going to be the name of the game. What assumptions can you guide us to as to when you stop, or when unit cost becomes less important than unit capability—and I am talking about the wings capability—even though you have fewer of them?

Mr. HALE. Well, again, I do not think I have a clear answer to that. I guess what worries me about this is——

Senator WALLOP. But we have to struggle with it, do we not?

Mr. HALE. Yes, we sure do. And the number of wings has decreased dramatically. A few years ago we had a goal of 44 wings. Then it was 40. Now we are at 35, heading for 26. It looks to us as though 18 is not at all improbable and, conceivably, under some unfavorable assumptions, a dozen.

I have a feeling, but I cannot raise my right hand and swear nor could I prove it as an analyst, that a dozen is just too few wings to maintain international presence. Maybe even the teens are too few wings.

So what frightens me about the trends is that I do not have a sense of what number is too few. I think you need the help of people other than me to decide how far down you can go. The Air Force would be a good place to start. But I would be worried, if I were you, about the trends that we see. Because unfavorable assumptions like further declines in the budget do not seem that implausible to me.

Senator WALLOP. I do not quarrel with that. I guess one of the other options that we may have to wrestle with—but would there not be another favorable assumption created by a future Navy decision, for example, to procure an ATF variant, some form of the NATF, to perhaps serve in their role and therefore assist in reducing unit procurement costs while gaining the benefits of advances in technology?

Mr. HALE. Possibly, though I would not think it would help the Air Force a lot. I presume that would be towards the end of the ATF buy, if that happened. I would also caution that taking Air Force aircraft and turning them into naval aircraft is tough because the demands of carrier operations often require an awful lot of modifications. Nor do I think this course would reduce the money the Air Force has to pay for the ATF. It may make replacing the F-14 less expensive for the Navy. It may also reduce the Navy's development costs for that plan, but I cannot see that it significantly helps.

Senator LEVIN. It also helps us.

Mr. HALE. Sure, yes. I did not mean to be too parochial here. But in focusing on Air Force tactical aircraft, I am not sure that it

solves that dilemma. It may help the Navy, if they decide they need an improved fighter.

Senator WALLOP. My time is up, but it would seem to me—two things. One is that this procedure appears to have given us three very good choices. One or the other or none. [Laughter.]

It would cause panic in Washington, would it not? It also strikes me that we may be on the threshold of being able to advance manufacturing technology that perhaps has not been available to us in a different era which entailed a different procedure for arriving at these decisions.

Senator LEVIN. Thank you, Senator Wallop. Senator Cohen?

Senator COHEN. Mr. Chairman, I think Senator Wallop would agree that neither party is clamoring for new taxes that I can detect in the coming years, and it is unlikely we are going to see a groundswell for increased spending on defense, notwithstanding the great victory that was achieved in the Persian Gulf, and we are more likely to see greater demands placed on the education budget or the environmental clean-up that is going to be necessary as we go into the 21st century.

You have indicated that one option would be to cancel the ATF and go to a Falcon-21++. You did not have any indication about why not cancel the ATF and go into an F-15XX. Is that because you accept the Air Force argument that it would cost nearly as much and not provide that much in capability?

Mr. HALE. Well, it probably would, though we would be in a position of accepting the Air Force cost estimates because we do not have any alternative, Senator Cohen. We did not look at the F-15XX option. We did look at just buying existing F-15Es and F-16s, though I did not talk about it in my oral statement. A real low mix, if you will. I think the F-15XX would probably not solve any of the long term cost problems. I think I am being fair, although we did not analyze it.

Senator COHEN. You did not look at whether it would perform the air superiority or ground attack mission?

Mr. HALE. No. We did not really look at the XX.

Senator COHEN. Did the Congressional Budget Office critically analyze the costs and capabilities of the Falcon-21++ and the F-15XX?

Mr. HALE. You know, frankly, it is difficult for us to do too much of this analysis because so much is black. We do not have access to some of the stealth capability. I think the answer is no, in terms of an extensive analysis of capabilities. We focused on affordability.

Senator COHEN. As part of your options that you looked at, you have indicated the average retirement age is 28 years of the aircraft. You indicated that if you had an average retirement age of 28 rather than 22, which is the Air Force's projection, you could increase the number of wings from 18 to 22. You also indicated that rather than a new multirole aircraft you could have the F-16 mod, and that would give you an increase from 18 to 21. Did you combine the two and change both the retirement age and the modified F-16?

Mr. HALE. We did in the text. I think we did that case in the text. The effect of increased age and a cheaper MRF are more or less additive. We are looking out so far that you can more or less

add the extra four and the extra three wings and you are up around 25. The combination of those two gets you close to their goal.

Senator COHEN. Gets you closer to 26?

Mr. HALE. Right, and I think we note that point in the text.

Senator COHEN. Okay. Now, the Air Force's ATF acquisition cost estimate, I guess, was $103.7 billion?

Mr. HALE. Well, $73 million is the average unit procurement cost over their total buy of 750 aircraft. Are we talking about the same thing?

Senator COHEN. As I understood it, it was each, in then dollars, it came out——

Mr. HALE. Oh, then-year dollars. We are dealing in 1992 dollars. You may well be right.

Senator COHEN. Okay. Well—you do not have those figures?

Mr. HALE. I do not, off-hand. I hate to use then-year dollars out in the year 2020, or 2015, because I find them confusing. I do not have them.

Senator COHEN. Well, you do calculate inflation rates, do you not?

Senator WALLOP. We probably will not be around to have to answer for them, though.

Mr. HALE. You are right.

Senator COHEN. You calculate inflation rates, do you not?

Mr. HALE. Not if we can avoid it. We do not do too well, sometimes, projecting the next couple of years, Senator Cohen. We make assumptions. You are right.

Senator COHEN. Yes, you do.

Mr. HALE. You are right. We probably use 4 percent a year, or something like that.

Senator COHEN. When you make an analysis, do you use confidence levels? The Air Force uses confidence levels, for example. Do you take those into account when you make those kind of projections?

Mr. HALE. Do you mean in the costs, say? What we did was show a range of potential cost growth based on historical analogies, which we thought were as helpful as anything. We looked at an ATF cost of $100 million in 1992 dollars, versus $73 million and $135 million, which would parallel some of the past experience they have had in developing new planes.

Senator COHEN. Did you make any analysis of life cycle costs in this?

Mr. HALE. No, we did not. We did not look at operating costs at all. It is a fair question and a good point, too.

Senator COHEN. That is all I have, Mr. Chairman.

Senator LEVIN. Just a couple more questions. I want to go back to that issue of keeping an F-16 minimal base until we decide what follow-on we want for the multirole. Assuming that you had 4 years at 24 per year, I think you said that was $4.4 billion?

Mr. HALE. The added 4 years at 24 aircraft a year, we estimated at $4.4 billion in today's dollars.

Senator LEVIN. Today's dollars, and then we started talking about what might you save if you were able to buy a new multirole

plane, and you said well, we could buy a couple of thousand of those.

Mr. HALE. You might end up buying that many.

Senator LEVIN. Take your pencil and give me a range on savings.

Mr. HALE. If you want to speculate, and you will accept it as that—if developing a new plane pushes the cost up to $35 million, as we assume based on historical growth, versus $25 million, as we assume if you modify the F–16—you could save $10 million an aircraft. Multiplied by 2,000 is—am I thinking right?

Senator LEVIN. That is why we needed a pencil. What is that?

Mr. HALE. I think it is $20 billion.

Senator LEVIN. Is that current dollars?

Mr. HALE. No, no. That would be constant 1992 dollars. Everything we have presented to you is in constant 1992 dollars.

Senator LEVIN. So at least under that very hypothetical projection you might, by spending $4.5 billion now, save five times that much in the out-years?

Mr. HALE. Conceivably, yes. I mean, in fairness, they are not the same planes.

Senator LEVIN. And they are not the same planes.

Mr. HALE. No. A $35 million aircraft would presumably be more stealthy and have other added capability.

Senator LEVIN. Absolutely. But that is assuming you can build that other plane. I mean, you are raising the fundamental question as to whether we are going to have any money to buy a multirole plane, it seems to me.

Mr. HALE. Well, we will have some money for the MRF. But if you really wanted to pick a scare case, you would assume continued real declines in the defense budget and that would drive the affordable number of wings to ridiculously low levels. We did not do that, because I do not think we have any basis for assuming continuous declines, although I do not think you could rule it out either. But surely, if that happens, if we get another 20 or 30 percent reduction in the defense budget between 1995 and the year 2005, we will simply have to rethink a number of our approaches to both numbers and quality. It could be difficult to afford much of either, if funding dropped to really low levels.

Senator LEVIN. Take the most likely assumptions. If we are to have an ATF and a new multirole from scratch, how many wings are we going to end up with?

Mr. HALE. Our base case, which we would characterize as the most likely, left you with 18 wings as opposed to 26. That assumes, again, no real growth in the budget. It does assume, however, that tactical air gets back to its historical share. When I say no real growth, I mean that we apply this historical share to the 1995 funding. Right now, they are at a much lower level than would be implied by the historical share. The share gives them about $4.2 billion a year, I believe. Today, they are at probably one-sixth of that level in the 1992 and 1993 budgets. But that is presumably a cyclical low, so go back up to $4.2 million, $4.3 million, and keep that constant, develop a new multirole at $35 million, a new ATF, you are at about 18 wings.

Senator LEVIN. Senator Wallop?

Senator WALLOP. I will just make an observation. I mean, it is clear that you cannot do any of these projections without assumptions, but some assumptions can become self-fulfilling. Even assuming your 18-wing case, I am not at all persuaded that 18 wings of a fully capable new aircraft are not the equivalent of 26 wings of a just-modernized, currently 30-year-old aircraft. Just talking about developing a new plane to save on development cost, but we will have soon a significant portion of those development costs now which we would not just abandon if we went to modernize?

Mr. HALE. Well, depending on which of these options you took. If you took the one that bought upgraded versions of the F-16, that Falcon-21++, you would capitalize on some of what you had already done. It would incorporate the avionics that are being developed for the ATF as well as the engine that is being developed for it. So you would capitalize on some of that. It would be less capable than an ATF, though it would be more capable than today's F-16. Once again, I think it is useful to think about what world that is consistent with. There are two ways we could go, broadly speaking. If the Soviets continue modernizing, I suspect that we will be forced to follow and probably add funds.

Senator WALLOP. I would make one observation and declare myself finished on all of this. The one thing that distinguishes the Soviet Union today from the catastrophically incompetent third world country is, it seems inconceivable that unless it collapses as a nation, which is not inconceivable, but unless it does, it is very unlikely that they are going to back off of maintaining a presence; the only presence which gives them standing in the world. Thank you, Mr. Chairman.

Senator LEVIN. Thank you. Senator Cohen?

Senator COHEN. If I could just follow up on what Senator Wallop is saying. He made two important points this afternoon. One, I do not know who the Yale professor was who made the observation that if you have a country that is superiority armed, it is less likely that country will be attacked by an inferior armed country.

Senator WALLOP. If I may, that is not what I said.

Senator COHEN. I think it was what you said. Let me just finish. What I got out of your comment——

Senator WALLOP. I would like to have a chance to say what I said once again.

Senator COHEN. I will let you rephrase the Yale professor. But if you have a situation in which each country has roughly the same capability historically, that is when you tended to have wars or conflicts in the past. That is the point I think you were making, is that when one country tends to develop its superiority, it is less likely to find itself in a conflict with another country that maintains that superior edge. It is when you get a rough equivalence between countries that each one thinks they have a better chance of defeating the other, then you tend to have a better chance of a conflict. I think that is what I gathered was the essence of what the Yale professor was suggesting.

I think that is exactly the dilemma that we have to cope with now. Do we continue to stress superiority for the future? And we have to in order to make that judgment, superiority over numbers, we cannot have both in this circumstance if you are correct, in

order to make that assessment, we also have to take into account what the Air Force and our intelligence community will present to us, their best estimate as to what the capabilities of the Soviet Union is going to be in that same time frame. That is something that we will have to take a very serious look at, undoubtedly, in a closed session.

We can say in open session certainly that as far as their intent, right now they are modernizing their strategic forces without any abatement. In fact, when that becomes public in some detail, I think it will come as something of a surprise, the amount that they are devoting to the various weapons systems at the strategic level. To the extent that they continue to do that at the tactical level, then we have the other question we have to ask. What will these new aircraft of ours give us in added capability over what we project will be the Soviet's new modernized tactical air force. And then we will have to come to a judgment at that point whether or not, assuming your estimates are right and assuming everything tracks and assuming there are no more large increases in defense spending and no large reductions in defense spending, would we be better off with 18 wings than 26 wings? Would that be sufficient, given the edge in technology, to serve as an adequate deterrent or fighting capability if the deterrence failed? I think that is what we have to analyze in the weeks ahead.

Thank you, Mr. Chairman.

Senator LEVIN. Thank you.

Senator WALLOP. I will send you the article.

Senator LEVIN. I never read anything by Yale professors anyway. [Laughter.]

Senator LEVIN. Apologies to all you Yale professors out there. I went to Harvard. That is the problem.

Senator COHEN. That is the problem.

Senator LEVIN. That is the problem, right. Well, then, all the hisses are off the record.

I just want to make sure I understand. You have three options basically. The in-between option provides for the future technology for the ATF, slows it down somewhat in terms of when we produce it in order to make sure we have a follow-on multirole. That is what I would call your in-between alternative, which you called——

Mr. HALE. The silver bullet case is how we characterized buying very few ATFs, but slowing down its development to pay for the added cost of keeping the F–16 by slowing development.

Senator LEVIN. You do not necessarily buy fewer ATFs?

Mr. HALE. In that particular option you do. In order to maintain 26 wings in the long run, you would have to reduce the percentage of the force that was ATFs even if you kept down the cost of the MRF.

Senator LEVIN. So there are various permutations. You can have the advanced technology, ATF, but decide, in order to assure a multirole follow-on, that you go with the F–16 continuity, and you pay for it by slowing down the ATF.

Mr. HALE. You could also pay for it, obviously, by looking at other Air Force programs.

Senator LEVIN. Other Air Force or other programs outside of the Air Force.

We thank you both and thank Mr. Myers, also, of your staff for the great help that he has been as well.

The next panel is Gen. Joe Ralston, Director of Tactical Programs, and Gen. Richard Hawley, Director of Operations. General Ralston.

STATEMENT OF MAJ. GEN. JOSEPH W. RALSTON, USAF DIRECTOR, TACTICAL PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION; ACCOMPANIED BY MAJ. GEN. RICHARD E. HAWLEY, USAF DIRECTOR, OPERATIONS, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR PLANS AND OPERATIONS

General RALSTON. Thank you, Mr. Chairman. I would like to submit my statement for the record, and I have a few remarks I would like to make.

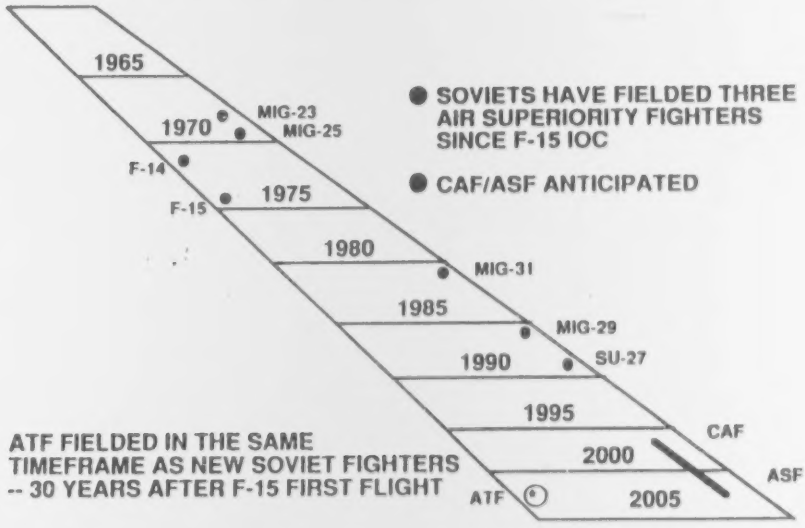
Senator LEVIN. That would be great. Thank you, General.

General RALSTON. Mr. Chairman, thank you for the opportunity for General Hawley and me to address the committee on what I consider to be the key issues of the Air Force for the future.

I would like to briefly discuss our top priority program, the Advanced Tactical Fighter, or ATF, that we have already discussed this afternoon. We have recently witnessed what happens in the war when one combatant has the ability to maintain air superiority and the other does not. And by air superiority, I mean the ability to keep enemy bombs from falling on friendly soldier's heads. I might add that not since 1953 has an American soldier been killed by enemy air action.

Air superiority also permits airlift and sealift forces to resupply our troops and it permits airlift operations such as are on-going today in Northern Iraq. We could not envision such an operation without air superiority. In addition, air superiority allows our air, land, and naval forces the freedom to maneuver to carry out the CINC's campaign plan. Air superiority does not come easily. And I direct your attention to the few charts that I have here.

AIR SUPERIORITY FIGHTERS



If you will notice, back in the early 1970s we fielded the F-15. It will be 30 years from the time the F-15 first flew until we get the first combat-ready ATF in the force. And that is if everything stays exactly on schedule the way that we have it planned today.

Now during that same 30-year time period the Soviets have modernized their air superiority force with the MiG-31, the MiG-29, the SU-27, and our intelligence community predicts that there will be follow-ons to the MiG-29 and the SU-27 around the turn of the century. Now we have modernized the F-15 during that time period. We have continued to upgrade it. But we think after 30 years that we have pretty well stretched the capability of that aircraft.

I might also add that there were those in the 1960s that said we did not need to build the F-15, that we should merely upgrade the F-4. And if we had done that we would have fought the most recent war with F-4s against Soviet MiG-29s. I know that this committee and certainly the Air Force would not like for us to have to fight the next war in the year 2015 with today's airplanes against a superior threat.

The Air Force started working on the ATF back in the early 1980s, 1981. Here, you see the two competitors, the YF-22 and the YF-23. Back in 1986 the Air Force followed the Packard Commission recommendations of competitive prototyping. We awarded contracts to the Lockheed Corporation for the YF-22 and to the Northrup Corporation for the YF-23. Each subsequently teamed with other manufacturers. In the case of Lockheed, they teamed with Boeing and General Dynamics. In the case of the Northrup, they teamed with McDonnell Douglas. For the past 5 years we have conducted a demonstration and validation program.

We have built four prototype airplanes that have flown in excess of 150 hours. We have built 12 engines, 6 by General Electric and 6

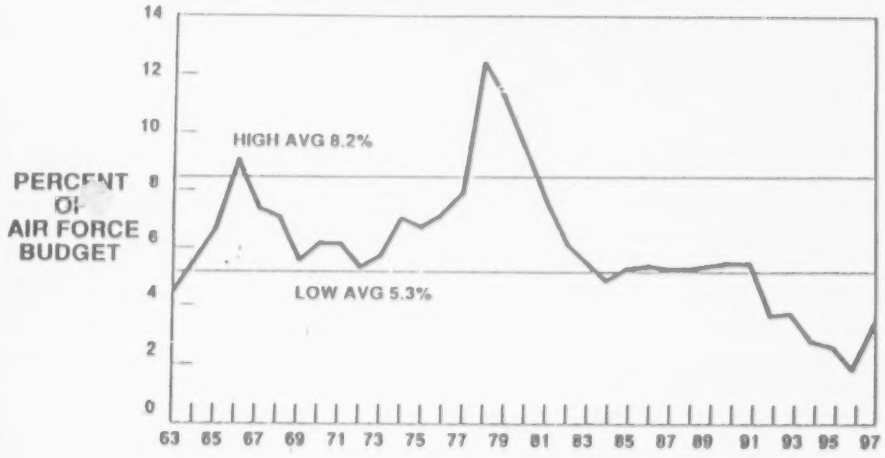
by Pratt & Whitney. We have over 4,000 hours of operating time on those engines. We have over 30,000 hours of wind tunnel testing on the prototypes. We have over 13,000 men in the loop simulations of engagements to try to refine the requirements and not ask for more than was absolutely needed to do the air superiority mission.

We have built full-scale models of each of the prototypes and tested them on poles to check their signatures, their radar cross sections with very good results. Avionics is always an area of concern. We have built flying avionics laboratories and put the radar and the other avionics devices on those flying laboratories to make sure that they perform as we thought they would.

Software is always an area of concern. We developed over 1 million lines of software code and tested that software code to make sure we understood the risks that were involved. All this was done to lower the risk of this very important program for the Air Force.

We recognize that affordability is a major issue.

TACTICAL FIGHTER MODERNIZATION



I would like to direct your attention to about 35 years of history. And this is the percent of the Air Force budget that is devoted to tactical modernization, to tactical fighter modernization. You will notice that there is a 10-year average low of about 5 percent. There is a 10-year average high of about 8 percent. But you will also notice the cyclical nature of that funding.

The decade of the 1970s was dedicated to tactical fighter modernization. During that time period we developed and fielded the F-15, the F-16, and the A-10.

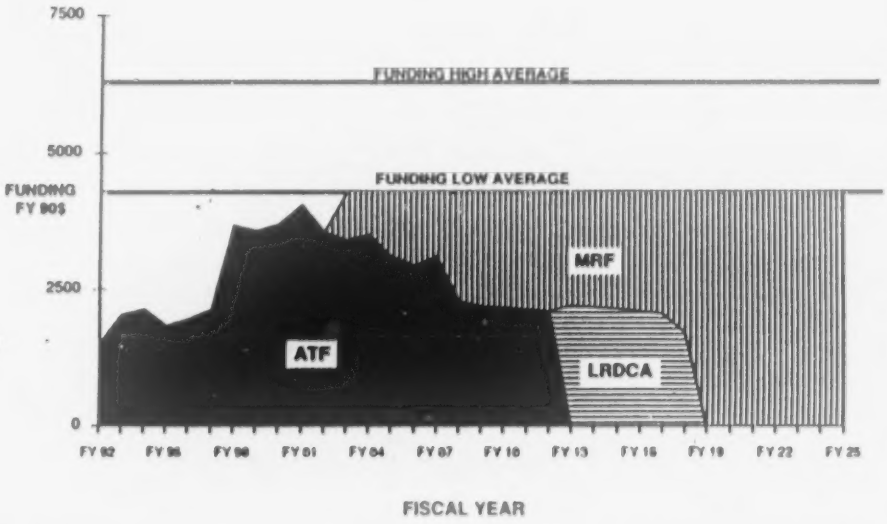
The decade of the 1980s was devoted to strategic modernization. During that time period we worked the MX, the B-1, the C-5. We started the B-2.

In the decade of the 1990s we are continuing with the B-2 and the C-17. And there is where you will notice the percentage of the

Air Force budget that is devoted to tactical fighters is significantly less than the 5 percent average low.

While after the turn of the century when the B-2 and the C-17 have come into the force, then it will be time for tactical fighter modernization again. So we, in our view, can expect more in the Air Force budget than the traditional 5 percent.

AFFORDABILITY



For the purposes of demonstration here, we assume that the Air Force would allocate 5 percent, that historical low of 5 percent of its budget to tactical fighter modernization.

We have shown here that we can buy the ATF, we can do the interdiction force upgrade, as well as the MRF and that will not necessarily be a new airplane, by the way. We have not made that decision. But it could very well be a derivative of today's F-16. That is one of the things we will have to look at as we go into the future.

But I am trying to show here that even if we take the pessimistic assumption of 5 percent of the Air Force budget for tactical fighter modernization, we could do the modernization that we need to do. And at the same time, if we bumped up to the 8 percent, the 10-year average high, we would have considerably more head room.

I would like to turn to one other subject. And that is the alternative study. Last year the committee requested the Air Force conduct a comprehensive evaluation of alternative aircraft to do the air superiority mission. I am pleased to report to you that we have conducted that evaluation. I might add that our primary focus during this study was to be objective.

We looked at the MAC Air entry, the F-15XX. We looked at the General Dynamics entry of the Falcon-21++. Each contractor had the complete freedom to submit an aircraft design that could do the air superiority mission. Now to ensure objectivity we took the

proponent for the F-15 in the Air Force, the F-15 program office, and they worked with the contractor McDonnell Douglas. We took the proponent for the F-16 and had them work with General Dynamics. And then we had an independent team of technical experts, as well as cost experts, look across the board at the F-15, the Falcon-21, and the ATF. In addition we had the effectiveness analysis done by Air Force Studies and Analysis to ensure that we did not have undue influence from the ATF program office.

In addition, each contractor was given full access to all of our special technologies to make sure that there was a level playing field and that each had knowledge of those technologies as they applied to the air superiority mission. Over 7,000 manhours on the part of Air Force personnel were devoted to this effort. In addition, we involved the professional staff of this committee to review the raw results and to get a thorough review of our effectiveness analysis. I will cover the specifics of that analysis in closed session. But I think it is fair to say that both alternatives fell far short in their ability to assure that we could attain the needed air superiority in future conflicts. Additionally, the study concluded that neither aircraft was a low-cost alternative for modernizing the air to air force.

And, last, and something that is of concern to us, the risk that we have reduced in the ATF program through the past 5 years and $5 billion of investment is something that we take very seriously. We are concerned about abandoning that approach for what is essentially a paper design of alternatives.

In summary, we believe that we have complied with both the spirit and the letter of this committee's request. We have concluded that the ATF is needed to ensure air superiority in future conflicts. We have concluded that alternatives to the ATF do not appear to be a low-cost answer for the air to air modernization. And we believe that the ATF is affordable in our constrained budget while modernizing the close air support interdiction and multirole forces.

Mr. Chairman, I thank you for the opportunity to appear before this committee. General Hawley and I are ready to take your questions.

[The prepared joint statement of General Ralston and General Hawley follows:]

PREPARED JOINT STATEMENT BY MAJ. GEN. JOSEPH W. RALSTON, DIRECTOR OF TACTICAL PROGRAMS, ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION, AND MAJ. GEN. RICHARD E. HAWLEY, DIRECTOR OF OPERATIONS

Mr. Chairman and members of the committee: General Hawley and I are pleased to appear before you to review the Air Force's proposed tactical modernization activities for fiscal year 1992.

The continuing challenge of Air Force modernization is to provide the most capable and effective systems and equipment needed by our aerospace forces to implement our basic military strategy of deterrence in the most efficient manner possible. To do this in the face of continuing force reductions and budget constraints, we must rely on our two greatest strengths: well-motivated high-quality people and technological innovation.

We approach this challenge of efficient acquisition amid an ever-changing world. The Soviet Union is moving toward their commitment to withdraw from Europe and the Warsaw Pact has dissolved. Improvements in U.S./Soviet relations continue to reach a new plateau and arms reduction talks are ongoing. Nevertheless, internal political struggles within the Soviet Union are a major concern for us as well as the continued threat of Soviet capabilities. They remain the one nation in the world

with the capability to destroy the United States. We must maintain our ability to deter them.

As we focus our strategies to contend with regional contingencies, we are reminded that there is a disturbing number of countries with formidable conventional forces that threaten United States interests—as evidenced by our recent struggle in the Persian Gulf. These countries have modern, high technology aircraft from Soviet and Western suppliers. We must be prepared to deter aggression in these regions and maintain the technological superiority to achieve our military objectives if deterrence fails.

Desert Storm presented this Nation with the first large-scale practical test of our ability to span the globe on short notice in response to a crisis. We were remarkably successful in our deployment; however, we have learned some critical lessons and gained valuable insights into requirements for future engagements.

Desert Storm validated the key tenets of Secretary Rice's Global Reach, Global Power doctrine. The Air Force maintains the unique ability to deploy quickly, concentrate force with surprise and speed, cover long distances, and provide a wide array of lethal and non-lethal actions. These characteristics of modern airpower—speed, range, flexibility, precision, and lethality—are captured in the budget priorities for Air Force tactical air modernization.

The effectiveness of properly employed tactical air power was clearly demonstrated in Operation Desert Storm. It is the most flexible and responsive component of the military arsenal. To maintain our ability to meet future threats, modernization must continue even while force structure is being reduced. Air superiority is an absolute necessity to successfully prosecute any military operation. It permits freedom of maneuver for our commanders, protects the lives of our own ground forces, restores the element of tactical surprise to the battlefield, and deprives the enemy of sanctuary. Since we fielded the F-15, the Soviets have fielded and deployed throughout the world three new air superiority fighters and the prospect for entirely new follow-ons to the SU-27 and MiG-29 sometime after the turn of the century remains a concern. In contrast, it will have been 30 years since the first flight of our F-15 before we field the Advanced Tactical Fighter (ATF).

While we are on the subject of the ATF, let me take this opportunity to address the ATF alternative study this committee requested in last year's language. The alternative study was an objective, thorough review of cost, schedule, risk, and ability of alternative aircraft designs to perform the air-to-air mission. The study was under the direction of the Tactical Program Executive Officer who assigned proponents for the alternative aircraft, the F-15 and the F-16 Program Offices, to work with McDonnell Douglas on the F-15XX and General Dynamics on the Falcon-21 + + respectively. Each contractor was given access to applicable special access programs and the freedom to submit an aircraft design. Independent technical and cost teams were established to validate the proposed alternative designs. After hundreds of hours of simulated engagements, both the F-15XX and the Falcon-21 + + were shown to fall far short in their ability to ensure that we could attain the needed air superiority in future conflicts. Additionally, the study concluded neither alternative aircraft is a low cost answer for modernizing the air-to-air force. The ATF, having completed an extremely successful Demonstration/Validation phase, is ready for the next phase of development—the newly named Engineering and Manufacturing Development (EMD) phase. Following the recommendations of the Packard Commission to demonstrate hardware and software, and to fly-before-buy, the ATF no longer carries the higher risk of paper designs. With the completion of this study of alternatives, we believe we have fully complied with the spirit and intent of the committee language.

In addition to the ATF, the Advanced Medium Range Air to Air Missile (AMRAAM) is essential to maintain the qualitative edge over an ever-increasing threat of advanced fighter aircraft and armament proliferating throughout the world. The F/A-16 is needed to modernize our aging Close Air Support/Battlefield Air Interdiction (CAS/BAI) force. Funding is requested to develop a modification to existing F-16s to provide the enhanced capability we need to continue to support the Army. Standoff air-to-ground weapons outside of point defenses are required to successfully implement our roll back of enemy air defenses and to strike critical, high value targets in heavily defended areas. We will continue to modernize this area through procurement of the AGM-130 powered 2,000 lb. precision guided bomb, and continued procurement of the HARM anti-radiation missile.

Efficient and flexible employment of our forces relies on accurate and timely command and control. We are modernizing this area through necessary upgrades to the Airborne Warning and Control System (AWACS) to maintain its effectiveness against an advanced threat, and continued funding for the Joint Surveillance Tar-

geting Attack Radar System (JSTARS) development program that was interrupted by the deployment to Desert Storm. In addition, real time tactical reconnaissance for mission planning and accurate damage assessment is critical. Funding for the development of the Follow On Tactical Reconnaissance System (FOTRS) is included to provide a responsive capability to our field commanders.

Essential upgrades in the EF-111 System Improvement Program to counter newly emerging threats also continue. As tactics were validated during Desert Storm, the EF-111 provided escort jamming for nearly every coalition flight package into Iraq. Funding is also requested to continue development of Mission Planning Systems. These computerized preflight planning and rehearsal systems increase the effectiveness, responsiveness, and survivability of our air sorties, are important for pilots to effectively use our new sensors, and are essential to program and employ our advanced "smart" weapons.

The activities I've presented represent a carefully balanced program. We have consciously reduced our tactical force structure in order to achieve the necessary modernization. We must maintain the critical technological edge needed to successfully attain our military objectives and protect the lives of American soldiers on the future battlefield. In our view, our tactical modernization plan does just that while striking the balance between prudent risk and fiscal realities.

Thank you, Mr. Chairman, for the opportunity to make this statement. We will be happy to answer your questions.

Senator LEVIN. Thank you, General. I would like to focus on the MRF question. One of the conclusions of the Congressional Budget Office presentation is that the Air Force is going to need an affordable replacement for the F-16 if it is going to be able to keep an Air Force of at least 26 wings. I am wondering if you will agree with that conclusion, that you are going to need an affordable replacement for the F-16 to keep 26 wings?

General RALSTON. Yes, Mr. Chairman, we do agree with that. While I cannot tell you exactly what the MRF will be today, one of the prime characteristics is that it has to be affordable. It has to recognize the affordability constraints.

Senator LEVIN. That Congressional Budget Office analysis shows that historically every time we stop one production line and start a new one, that the replacement aircraft costs on average 80 percent more than the one that it replaces. My question here is whether the Air Force can afford to buy a replacement for the F-16 if it costs 80 percent more than the F-16?

General RALSTON. I would have to say that in my view the MRF that costs 80 percent more than today's F-16 is not in the cards.

Senator LEVIN. Which means it would not be affordable?

General RALSTON. Yes, sir.

Senator LEVIN. Is it more likely that you can build an affordable MRF in the future if it is a derivative of the F-16?

General RALSTON. I think that we certainly would make the derivative of the F-16 a very strong candidate in the role for the MRF. That is not to say that that is the answer today. But we would certainly like to see a competition. We would like to see other people try to give us an affordable MRF. And one of the ways that we would ensure that we keep competitive pressure on other new aircraft designs is to keep a derivative of the F-16 to keep that pressure on.

Senator LEVIN. And is it more likely that the derivative of the F-16 that we would like to consider as an option, one option, for the multirole follow-on, is it more likely that that F-16 follow-on would be more affordable if we had it being produced in the interim?

General RALSTON. I think that is a fair statement, that if you kept the F-16 line open, then that gives you a springboard for a more affordable derivative of an F-16.

Senator LEVIN. I understand that is only one of the options we would want to look at. Has the Air Force weighed the cost of maintaining a productive base at a very low level until we had to select what option we wanted to pursue for that MRF against the possible savings in the cost of that MRF on the assumption that we went with the M-16 derivative for that multirole follow-on? That is an awfully complicated question. Is it clear?

General RALSTON. I understand, Mr. Chairman. I cannot point to a definitive study that shows you the exact numbers, but I can tell you that that is a topic of discussion, was a topic of deliberations as we went through the making of the fiscal year 1992 President's budget. We have, as you know, funds to keep the F-16 line open in fiscal year 1992 and in fiscal year 1993 in the President's budget. I think there will be continued discussions as we build the 1994 POM and the 1994 budget of exactly those kinds of trade-offs.

Senator LEVIN. If you could give us for the record your current best assessment on that issue it would be helpful.

General RALSTON. Yes, sir.

[The information referred to follows:]

MULTIROLE FIGHTER (MRF)

In my opinion, to be affordable, the cost of a newly developed MRF would have to be roughly the same as the cost of an MRF derived from an ongoing F-16 design. Therefore, the difference in the two approaches is primarily the difference in the development cost and the expense of maintaining the F-16 production line leading to a derivative MRF. The cost of developing a new MRF is estimated to be about $5 billion more than the cost of developing an F-16 derivative MRF. This must be discounted by the estimated $3 to $4 billion cost of keeping the F-16 line open while developing a derivative MRF. The net difference, therefore, is that a program to develop an entirely new MRF would cost approximately $1 to $2 billion more than a program to develop an MRF derived from an ongoing F-16 production line. I must stress that a lot of work needs to be done in this area and we do not have definitive answers to these questions at this time. We will continue to work with the committee on this issue as we proceed.

Senator LEVIN. Two years ago Congress approved a multi-year contract for the F-16. At that time the procurement plan called for buying 600 aircraft over a 4-year period. Since that time the program has been cut back. Now the Air Force plans to terminate production after building only 330 aircraft. Staff has been told that the contractor is still executing the subcontracts, though, for 600 aircraft. Again, even though the budget calls for only the 330 aircraft, is, in fact, the contractor still executing subcontracts on the basis of a 600-aircraft multi-year procurement program?

General RALSTON. Mr. Chairman, last December, December of 1990, the contractor was informed that he should stop the execution on the 600 aircraft multi-year buy. And I might add that when we started the 600 aircraft multi-year buy over 4 years we anticipated 150 airplanes per year.

In the fiscal year 1991 appropriation we were cut to 108 airplanes for fiscal year 1991 with the thought of 72 airplanes in 1992 and in 1993. Last November we were up against a contractual deadline. We had to make a decision on what to tell General Dynamics to do at that point. We chose the number of 402 airplanes,

which was 150 plus 108 plus the two 72 per year. It was the best information we had at that time and that is what we directed the contractor to plan for. We also told them that 198 other sets of parts that they had been working on, the difference between the 402 and the 600, that they should do everything they could to save the taxpayer money with that, if we could apply some of those parts to foreign military sales, that we should do so. I know that is a complicated answer, but we directed the contractor as of last December to not plan on the 600 multi-year buy but a 402 aircraft buy instead.

Senator LEVIN. Thank you. I will come back to that. My time is up. Senator Wallop?

Senator WALLOP. Thank you, Mr. Chairman. I think the graph that you presented, General Ralston, on the funding averages, the 10-year average increments, is interesting and informative. I am not suggesting it is the only judgment that you would make, but if you maintain a hot F-16 line in the near-term with large numbers of what the Congressional Budget Office identified as surplus aircraft, will that not distort those funding levels, say over the next 4 or 5 years?

General RALSTON. Senator, I believe if you would look at the chart over there and start at the left hand side of it, you will see a white area below that 5 percent line. Now, if Congress chose, you could, in fact, fund the F-16 line during that time period and still not get up to the 5 percent of the historical low.

Senator WALLOP. Logic tells me that you would be using that money which could be used for something else as a near-term procurement to maintain the balance in the out-years of the fighter funding.

General RALSTON. That would be a very difficult trade-off. As we went through our priorities, the way that it came out in the President's budget was to not keep the F-16 line open beyond 1993.

Senator WALLOP. Why is the Air Force developing a single mission aircraft with the force structure drawing down to 26 tactical fighter wings? It seems to me that conventional logic might talk you into a multirole airplane for all of the roles.

General RALSTON. Certainly the multirole aircraft becomes more important as you go down in total force structure. But in our judgment, the one mission that is absolutely required in order for you to do the other missions is the mission of air superiority. And in that light, we think that it is appropriate to devote a very small percentage, and then we have about 20 percent, so it is not a large percent of the force structure, to the ATF to make sure that we can attain air superiority. And that allows the other missions, the interdiction mission, the close air support mission, to be able to operate effectively.

Senator WALLOP. If it is successful, then, the requirements for sophistication in the multirole airplane would seem to diminish.

General RALSTON. That is exactly correct. If you can assure that we can have air superiority with a very small percentage of the high end of the force, that says that you can get by with a less sophisticated multirole aircraft to do its mission.

Senator WALLOP. So the plus plus might well be an option then, if you get adequate funding for the ATF?

General RALSTON. If we were sure of the ATF, then the Falcon-21 or quite frankly, perhaps, a lesser derivative of the F-16, could very well serve in the multirole force.

Senator WALLOP. Does the addition of stealth capability into the ATF reduce the aircraft's ability to perform the air to air mission?

General RALSTON. No, sir. In my judgment, it does not. We still have superior maneuverability, superior acceleration, much superior to today's generation F-15, even with the stealth technology that we have in the ATF.

Senator WALLOP. One of the reasons I ask is that some of us had the very good fortune of being able to visit Saudi Arabia just 2 weeks after the war and were very impressed with the interviews that we had at Al-Khusus with the fighter pilots there. One of the things that impressed me most was the distance at which those air to air engagements took place. Unlike the Top Gun movies, they were not nose to tailpipe, but at significant distances. I guess I would not be inclined to say, now, how far we heard that to be because I have not seen it. But they were significant. I guess that brings into question, why do we need high flight performance with stealth capabilities and advance technologies if we are going to be engaging at those kinds of distances?

General RALSTON. Number one, we would still like to have the ability to engage at those ranges and we think stealth technology helps you do exactly that. You want to see the enemy as far out as you can, get your missile in the air, get first look, first shot, and first kill, as we call it, before he even sees you.

One of our concerns, as the enemy brings stealth technology to his force, is the overall battle engagement area is likely to shrink because we will see him at a shorter distance than what we are accustomed to, as he sees us. And when you do that, you stand a much greater chance of getting involved in a maneuvering dog fight, if you will. So we cannot just bet on stealth technology alone. We have to assume that he is also going to go to that technology and we need the ability to maneuver in close in engagement as well.

Senator WALLOP. Mr. Chairman, thank you.

Senator LEVIN. Senator Cohen.

Senator COHEN. A few quick questions. I am not clear on this chart here, General. What are the unit costs that you have assigned to the ATF, the MRF, and the LRDCA?

General RALSTON. For the MRF, we assigned $25 million a copy. And these are roughly in today's dollars.

Senator COHEN. $25 million?

General RALSTON. Yes, sir.

Senator COHEN. Okay. The Congressional Budget Office had $35 million for that.

General RALSTON. They assumed $35 million in theirs. We assumed $25 million in ours.

Senator COHEN. Right.

General RALSTON. Versus today's F-16 of about $20 million. So it is about a 25 percent increase to the F-16.

Senator COHEN. And the others?

General RALSTON. In the case of the ATF, in today's dollars, fly away cost, we assume $56.9 million or about $55 million. Let me say about $55 million.

Senator COHEN. And the Congressional Budget Office had what, $73 million?

General RALSTON. But we are using different kinds of dollars. To put it in apples to apples for you, the Congressional Budget Office used about $73 million in fiscal year 1992 dollars. That is not fly away cost. That is total production, divided by the total number of airplanes. We agree with that number in the sense, ours is about $60-some million if you calculate it the same way and if you put 2 more years of inflation on there, from 1990 to 1992, it comes out roughly in the low $70s. So we do not quarrel with the Congressional Budget Office's number, and that is the number in constant terms that we have on that chart there.

Senator COHEN. And for the ground attack?

General RALSTON. For the interdiction, we assume costs comparable to the ATF. It would be a high end mix, if you will, at the interdiction end of the spectrum.

Senator COHEN. Did you also calculate on your acquisition costs, then-year dollars per unit?

General RALSTON. Yes, sir.

Senator COHEN. Does it come out to what, $103.7 million?

General RALSTON. If you put the total ATF program in then-year dollars, it was about $103 billion. But I might add that that has been updated in that when the new inflation indices came out for then-year, that went to about $108. But that was based on the new inflation indices.

Senator COHEN. $108 billion?

General RALSTON. That is for 750 airplanes.

Senator COHEN. Right. And in other Air Force programs, do these cost estimates, are they based on a confidence level? Do you have 70, 80, 90 percent confidence levels that you normally apply to these kinds of cost projections?

General RALSTON. I will have to provide that for the record, Senator. I can tell you that the way those costs are done, the program office uses their best estimate to do that. Then that is independently verified by an independent cost analyst, different set of people. That is further independently verified by the Office of the Secretary of Defense cost analyst. So they get many scrubs as they go through there. To give you the exact percentage of the confidence level, I will have to provide that for the record.

[The information follows:]

TACTICAL AIR FORCE FIGHTER MODERNIZATION

The data to support the ATF cost estimates have evolved over a 4-year $5 billion dem/val program. Dem/val was specifically designed to reduce program risk and enter engineering and manufacturing development with validated design specifications. The ATF cost estimates are based on the very best information and cost estimating methodologies available. Therefore, at this stage of the ATF program, we believe the ATF cost figures have the highest fidelity of any cost estimates for any program at a comparable stage of development. We have a great deal of confidence in our cost numbers, but estimating costs 20-plus years into the future is not an exact science. We simply do not have a means to put a quantitative, statistically relevant, confidence level against the total program cost figures.

Senator COHEN. Do you have a life cycle cost estimate on the program?

General RALSTON. I will have to also provide that for the record. That is approximately another, I am going to give you a number of about $30 billion life cycle on that, but I will provide that for the record.

[The information follows:]

TACTICAL AIR FORCE FIGHTER MODERNIZATION

The operational and support (O&S) cost for the ATF over a 20-year life in fiscal year 1990 dollars is expected to be $32 billion. The O&S costs are day-to-day expenses for operating the aircraft (i.e., fuel, maintenance, support, training, etc). If the F-15C O&S costs were projected over the same time period, it would be $45.4 billion. The 30 percent savings in ATF cost can be attributed to improvements in aircraft reliability, supportability, and maintainability.

Senator COHEN. There has been some speculation that I have read that the proposed buy for the ATF is going to be reduced from the current plan of 750 and they range anywhere from 450 to 650. Has there been any decision on that that you are aware of in terms of a reduced buy?

General RALSTON. Yes, sir. When Secretary Cheney briefed this committee on the major aircraft review, he said the number was 750 ATFs, but that number was subject to review as we went through the force structure reductions. Based on our latest force structure, the 26-wing force structure, we have about 5 1/2 wings of ATFs. That is a reduction of ATF wings. And that 5 1/2 wings of ATFs comes out to approximately 650 airplanes. That is for the combat coded airplanes, the trainers, the backup aircraft inventory, as well as attrition reserve for 22 years, comes out to approximately 650.

Senator COHEN. In the Congressional Budget Office silver bullet option that Senator Levin talked about, the Congressional Budget Office proposed slowing down the ATF development and deployment in order to keep that F-16 line open. In your judgment, is it feasible to slow the development of the AFT down any further than what Congress has already done?

General RALSTON. Senator, in my view, that is not feasible to slow it down any more than what it has been. It is already the least concurrent of any program in history, and it is stretched out pretty well right now in development.

Senator COHEN. Did we not delay that 3 years last year?

General RALSTON. When we went through the major aircraft review, Secretary Cheney slipped it about 2 years to the right. And that has been in our calculation since that point.

Senator COHEN. Do you have any estimate, if we did slow it down further, what it would cost in terms of unit production?

General RALSTON. No, sir, I do not. I would have to find out how much you are talking about slowing it down and we can try to work an excursion on that for you. But I do not have that off the top of my head.

Senator COHEN. I was just trying to reconcile it with the Congressional Budget Office's silver bullet approach. We may need that for the record later on.

General RALSTON. Yes, sir.

Senator COHEN. Thank you, Mr. Chairman.

[The information follows:]

We have conducted a preliminary cost excursion on the impact to unit average cost if the Air Force implemented the Congressional Budget Office's "silver bullet" approach. The "silver bullet" approach cuts the number of air superiority fighters in half while increasing the number of multirole fighters. Our assumption for the "silver bullet" case is to buy a total of 324 ATFs at 24 per year (versus 648 ATFs at 48 per year as now planned). Using this assumption, the average unit cost increased 30 percent from an average unit production cost of $67.1 million for 648 aircraft to $87.3 million for 324 aircraft in fiscal year 1990 dollars.

Senator LEVIN. You just indicated to Senator Cohen that your current long-term inventory goal for ATF is now about 650?

General RALSTON. Yes, sir.

Senator LEVIN. Has that affected those numbers there at all? Is that the total cost there for ATF?

General RALSTON. The green number is the total cost for 650 ATFs.

Senator LEVIN. On per unit cost, how does that change, going from 750 to 650, do you know?

General RALSTON. Going from 750 to 650 reduces the total program cost in then-year dollars about $15 billion.

Senator LEVIN. From what to what?

General RALSTON. Reduces it from about the $108 billion to roughly, I am going to say, $95 billion, close to that. I am sorry. Let me say, reduces it from $110 billion approximately to about $95 billion. Now, it also increases the unit cost by about 8 percent when you reduce that 100 airplanes.

Senator LEVIN. Go back with me, if you would, to that F-16 multi-year issue, multi-year contract issue. You have instructed the contractor that you will be purchasing 402 instead of 600 aircraft during that period, I think that is where we left off on my last round.

General RALSTON. Yes, sir.

Senator LEVIN. Is the Air Force going to be terminating the multi-year contract, or amending it, or what?

General RALSTON. We would prefer to amend the multi-year contract. And we are currently working with the contractor at this time to do that. We would prefer not to terminate the contract because of the rather large termination cost.

Senator LEVIN. What is the time frame, roughly, for that? Is that going to happen in the next few months or few weeks, or where are we on that?

General RALSTON. It is more likely to be over the next few months. This is a very complex undertaking. We have never, certainly to my knowledge, ever had a multi-year contract that we have gone back and tried to reduce. It is plowing new ground in many areas. It is going to take several months to sort all of that out.

Senator LEVIN. You have indicated a goal, initially, for the ATF to cost about 20 percent more than the F-15. The Congressional Budget Office chart indicated and the testimony indicated that ATF procurement unit cost will be about 75 percent greater than the average F-15. That is quite a difference. How confident are you in the cost projections for the ATF?

General RALSTON. Mr. Chairman, I think that we have a great deal of confidence in the cost estimates. One thing that is a little different about the ATF program, in exception to other programs, we have just completed a 5 year demonstration validation phase where we have built actual hardware. We have done the software. We have had the avionics flying laboratories. And we think, at this point in the program, we have far more confidence than in any program in, certainly, modern history of the Air Force.

Senator LEVIN. You have indicated that this is a program which has been stretched out already, the ATF, and there is very little concurrency in it. That is an area of great concern to us because of the B-1 program, a concurrency there which cost us so heavily. How would you describe the level of concurrency that is left in the ATF program?

General RALSTON. I would say that it is extremely minimal. Now the balance, as you know, Mr. Chairman, that you try to strike on concurrency is, if you have too much concurrency, then you may make some poor decisions and you have to go back and correct things. If you have too little concurrency, you wind up paying an enormous amount in the FSD program while you are waiting to get started into production. We have tried to strike the best balance we can. We have got, certainly, in our view it is the least concurrent, as I say, of any aircraft program that we know of in history.

Senator LEVIN. I talked to you before about the cost of maintaining an F-16 base and how we might pay for that by delaying the ATF a year or 2. I thought that is what we were chatting about, and you talked to Senator Cohen about that too. You indicated you would provide some comparative costs for the record, what the savings would be to the future F-16 follow-on if we decided to go that route, plus what the short-term cost would be, and what the cost of the ATF program would be if we decided to stretch it out. Are those figures, have they already been generated so that you weighed those options in the Air Force, or is that something you are going to have to generate now, those various options?

General RALSTON. Mr. Chairman, to my knowledge, they have not been done. I will do the best I can to generate the best numbers we can for you.

Senator LEVIN. Thanks. I think the other questions I will save for our executive session. Senator Wallop.

Senator WALLOP. Mr. Chairman, I would just make, again, a couple of observations. One of the things that causes me the most anxiety, because it is just not relevant, is this unit cost comparison. We focus on that and then ask General Ralston, you know, this is going to cost 80 percent more according to the Congressional Budget Office, but yours is lower. And then toss into the equation a further stretching out of the program, which only tends to distort and disrupt the unit costs a little further down the road and makes the figures that you give us, however you decide upon them, less and less relevant.

And I know you have to examine it because politically somebody is going to say, well, can you imagine flying around in a fighter plane that costs X-millions of dollars as they are saying now with B-2s that cost X-hundreds of millions of dollars. But every time that we seek to make an adjustment in that, we add to the unit

cost and then complain that it is higher than it was when we started.

So it concerns me, this focus on unit costs. I am not quite certain how to escape it, but I would like to put some relevant twist on it because by asking you to further stretch out, or buy fewer airplanes, or both, I mean it is clear that the unit cost figure becomes more and more distorted.

And I guess the other observation I would like to make now, figures out show that Soviet Union foreign trade declined 33 percent last year. And they are now a net importer, contrary to public opinion, of oil. And they are no longer an exporter. They have desperate need of hard currency. It strikes me that one of the things that we are sitting here preparing for and talking about is a Soviet engagement where it is very likely it will be an engagement with Soviet aircraft rather than with Soviets. Is that not the case? And they will be modernized, whether or not there are Soviets flying them.

General RALSTON. One of the things, Senator, that struck us as we went through this analysis, was the very short period of time from the time that the Soviets fielded the MiG–29 until it showed up in regions, hot spot regions around the world, we will have every reason to believe that a similar fate would come to their follow-on to the MiG–29.

Senator WALLOP. It is becoming one of the few things that can generate hard currency for a nation whose economy is otherwise in a state of almost total collapse. It seems to me that we have to figure out whether we are confronting their aircraft with red stars on them or with other combinations of colors and stripes and bars, that we still are going to have to confront it. With that, Mr. Chairman, I will close.

Senator LEVIN. Thank you, Senator Wallop. Gentlemen, we thank you. We will keep the record open for your answers.

Now we are going to go into executive session. We will move to room 232 for our executive session. We stand adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

COST INCREASE FOR ADVANCED TACTICAL FIGHTER

Senator THURMOND. Mr. Hale, in your testimony you indicate cost estimates for development and procurement have increased over last year's estimates by about 16 percent and 17 percent. Are these percentages of growth reasonable and how much can we expect them to grow if we reduce the buy to five wings of Advanced Tactical Fighters?

Mr. HALE. The Congressional Budget Office is unable to evaluate whether the rates of growth are reasonable. Nor has the Congressional Budget Office done an independent estimate of the impact of the reduction in total program quantities to procure the roughly five and a half wings the Air Force now plans to buy. These increases do suggest, however, that further, larger cost increases might be possible. Indeed, General Ralston's testimony suggests that the reduction in procurement quantities will result in an additional increase of about 8 percent in the plane's unit cost. The decrease in quantity will keep the total program funding at a level slightly less than it was before the quantity was reduced, according to the General. But decreasing the total buy means that the Air Force is either already accepting a reduction in size of its future forces, or that the service will need to buy more MRFs, increasing the importance of keeping that plane's costs down.

SILVER BULLET FORCE CONCEPT

Senator THURMOND. Mr. Hale, under your silver bullet force concept, how many ATFs would you envision, if we are to maintain 26 tactical fighter wings?

Mr. HALE. The alternative assumes that about 10 percent of the force would be ATFs.

ENHANCED CLOSE AIR SUPPORT AIRCRAFT

Senator THURMOND. Mr. Hale, some military analysts would prefer that the Air Force focus on enhancing its ground attack capability in lieu of ATFs. Would you give me your perspective on this suggestion?

Mr. HALE. Alternative one, described in some detail in the testimony submitted for the record, might be appealing to those who believe more ground attack capability is needed. It continues to buy the F-15E aircraft that has more capability attacking targets on the ground than other aircraft considered, though the F-15E is not typically considered a close air support aircraft. The plane would provide considerable ground attack capabilities in what the Air Force terms the interdiction mission.

RESERVE FORCES

Senator THURMOND. General Hawley, the Air National Guard tactical fighter units made significant contributions during Operation Desert Storm. I understand, however, that their capabilities were limited by the age of their equipment. What plans does the Air Force have to upgrade the aging aircraft of the National Guard tactical fighter units?

General HAWLEY. The Air Force is pursuing an aggressive modernization program for the Air National Guard (ANG) tactical fighter units. There are currently 258 A-7 aircraft assigned to 13 ANG units. The ANG program will convert all units by the end of fiscal year 1993. Nine units will transition to the F-16C/D, one to the F-16ADF, one to the F-16A/B, and two to the KC-135. The two remaining units are assigned the Low Altitude Night Attack (LANA) variant of the A-7. There are currently 96 F-4 aircraft assigned to five ANG tactical fighter units. The fiscal year 1992 President's budget will retire all these F-4s and replace three units with the F-16C/D, one with the F-15 and one with the KC-135 aircraft by the end of fiscal year 1993. There are currently 72 A-10 aircraft assigned to four ANG tactical fighter units. The fiscal year 1992 President's budget will replace three of these units A-10s with F-16C/D aircraft during the next 2 fiscal years. A forward air control unit will have their OA-37s replaced with the A-10.

The fiscal year 1992 President's budget also funds a number of aircraft upgrade modifications for ANG tactical units. The two A-10 units are scheduled to have the Low Altitude Safety and Training Enhancement (LASTE) modification. At least two of the F-15 units are scheduled to have aircraft that have received the Multi-Staged Improvement Program (MSIP) modification. All the F-16A/B aircraft are scheduled to receive the Operational Capability Upgrade (OCU) modification.

ADVANCED TACTICAL FIGHTER (ATF)

Senator THURMOND. General Ralston, which of the ATF's characteristics do you consider to be the most critical in the future air war?

General RALSTON. The mission of the ATF is to obtain and maintain air superiority and this requires a careful blend of stealth, manueverability, super cruise, long range and adequate payload. Of these characteristics, stealth is the greatest contributor allowing our pilots to obtain first look, first shot, first kill.

TACTICAL RECONNAISSANCE

Senator THURMOND. General Ralston, I understand real time tactical reconnaissance was one of the areas criticized during Operation Desert Storm. What are the Air Force's plans to correct this shortfall?

General RALSTON. [Deleted.] [Kuwaiti Theater of Operations]. As many people have noted however, the film-based system lacked the responsiveness in delivering the final product, especially with an increase in the tempo during certain portions of the operation.

To correct this deficiency, the Air Force, as the Executive Service, leads the development of the Follow-on Tactical Reconnaissance System (FOTRS), a joint-service reconnaissance improvement effort. FOTRS consists of an airborne effort under the Advanced Tactical Air Reconnaissance System (ATARS) and a ground station effort

under the Joint Service Imagery Processing System (JSIPS). ATARS includes the development of a common sensor suite consisting of digital Electro-Optical (EO) and Infrared (IR) sensors, tape recorders, management system, and data link. The sensor suite will be common to Air Force, Marine Corps, and Navy manned and unmanned platforms. Manned platforms programmed to carry the common sensor suite are the USAF F-16C, the USMC F/A-18D(RC), and the USN F/A-18C. The Unmanned Aerial Vehicle Medium-Range (UAV-MR) will carry one ATARS sensor at a time, either EO or IR, dependent on mission requirements. ATARS' data link capability will allow images to be transmitted directly to USMC, USN, and USAF JSIPS ground stations for exploitation and dissemination.

Operation Desert Storm reinforced stated service requirements for interoperability and for a real-time/near-real-time tactical reconnaissance capability. FOTRS will meet the services' requirements.

MULTIROLE FIGHTER (MRF)

Senator THURMOND. General Ralston, the Air Force announced its intention to develop a new MRF. When do you expect this new aircraft to come on line and what do you consider to be its most critical mission capability?

General RALSTON. The new MRF is planned to replace the F-16 and will perform a variety of air-to-air and air-to-surface missions. The key to the MRF will be its flexibility to perform a wide variety of missions. The MRF will replace approximately 2,000 F-16s and therefore affordability is a major driver in this aircraft. We expect to need the MRF as the F-16 starts to age out of the system shortly after the turn of the century.

STEALTH TECHNOLOGY

Senator THURMOND. General Ralston, the Soviet Union is making considerable advances in fighter technology. Would you give us your assessment of how the Soviets are doing on stealth technology?

General RALSTON. There is no question that the Soviets understand the electromagnetic principles behind stealth technology. They have some very bright engineers and physicists who have written open source literature on the subject of stealth. Additionally, the F-117 and the prototype to the F-117 stealth fighter have been flying for 14 years. It would be naive to think some aspects of this technology have not migrated to the other side. Our national intelligence agencies are projecting the Soviets will field their next generation fighters with stealth capabilities around the turn of the century. Finally, the success of the F-117 in Operation Desert Storm will add additional incentive for the Soviets to field aircraft with this high leverage capability.

ATF AVAILABILITY

Senator THURMOND. General Hawley, the Air Force did a superb job in maintaining its mission capability rate for aircraft in support of Operation Desert Storm. What impact did this have on the availability of aircraft not assigned to the Persian Gulf theater of operations?

General HAWLEY. We compared our peacetime mission capable rates by aircraft type prior to the Operation Desert Shield deployments with those of Operation Desert Storm participants and non-participants both prior to and at the height of combat operations. With only one exception, we found no significant differences between stateside units and those deployed in support of Operation Desert Storm. The exception was the F-15E which had about 2 percent lower mission capable rates stateside than for those deployed. Our analysis of our data is continuing but initial indications are that this most probably is attributable to the fledgling state of the weapons system—the wing we deployed was just realizing initial mission capability when we asked them to deploy. As you know, the F-15E performed admirably in combat and we are confident that as the logistical pipeline matures and gains a broader support base that the F-15E will meet or exceed the supportability demonstrated by our fully fielded systems.

QUESTIONS SUBMITTED BY SENATOR MALCOLM WALLOP

SUPRESSION OF ENEMY AIR DEFENSES (SEAD)

Senator WALLOP. General Ralston, with the cancellation of Tacit Rainbow, how do you plan to attack enemy air defenses in the future?

General RALSTON. Although Tacit Rainbow was designed to provide a significant complementary suppression capability, the Air Force currently has a very formidable mix of weapons for suppression of enemy air defenses (SEAD). Our primary dedicated SEAD weapon, the High Speed Anti-Radiation Missile (HARM), can be employed by the F-4G Wild Weasel and F-16 aircraft. We plan to improve our F-16/HARM employment capability and also develop an F-15/HARM capability. The HARM, as a joint service munition, is also employed by numerous Navy aircraft. In addition to this dedicated capability, we have several precision guided munitions which, in certain cases, can be very effectively used for suppression. As was demonstrated in Operation Desert Storm, our operational concept for defense suppression is based on employment of multiple munition and aircraft types so that we can exploit the weaknesses of our enemy.

Senator WALLOP. General Ralston, do you have any plans for new programs to replace Tacit Rainbow?

General RALSTON. We do not have plans to immediately start a replacement program for Tacit Rainbow. Because of the program's cancellation, significant budgetary and force structure changes, changes in the world situation and a need to assess Operation Desert Storm, we are taking a comprehensive look at our "suppression of enemy air defenses" needs.

Senator WALLOP. General Ralston, are you working with the other services who also have similar requirements?

General RALSTON. Yes, the Air Force, Navy, and Army have our requirements and acquisition staffs jointly working this area.

CLOSE AIR SUPPORT (CAS) AIRCRAFT

Senator WALLOP. General Ralston, the Chief of Staff of the Air Force has indicated that the Air Force now plans to keep some A-10s to perform the close air support mission. Are you looking at any other aircraft to provide close air support in the future?

General RALSTON. The Air Force places high priority on the CAS/BAI mission area and plans to continue modernizing the CAS/BAI force. In addition to retaining two wings of A-10s, the Air Force plans to designate one wing of F-16 Block 40 Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) aircraft as CAS/BAI assets, and modify approximately three wings of Block 30 F-16s to an F/A-16 configuration enhancing CAS/BAI capabilities.

Senator WALLOP. General Ralston, should we be providing a night attack capability for the A-10?

General RALSTON. The USAF is currently studying requirements and analyzing alternatives. Potential upgrades will be considered along with existing or planned CAS/BAI force structure capabilities in order to optimize 24 hour support to ground forces. We expect to have these studies completed by the summer of 1991.

PREVENTION OF CASUALTIES FROM FRIENDLY FIRE

Senator WALLOP. General Ralston, during the Persian Gulf War, there were several incidents of casualties from friendly fire, including several resulting from close air support. There have been suggestions that ground vehicles be provided with "IFF"-type equipment to preclude such incidents. Can you tell us what you are doing to try to minimize these problems?

General RALSTON. Senator Wallop, first let me say that the identification of friendly forces has been a high priority subject within the Air Force and the Department of Defense for many years.

The use of "IFF"-type equipment is only one method available for identifying combat forces. Others include the use of visual recognition and markings, thermal and radio-frequency (RF) emissions, infra-red (IR) and laser equipment. All of these methods however, augment standardized procedures that form the nucleus of the identification process. These procedures are designed to minimize the risk to friendly forces by various means such as battlefield layout, location of forces, and operational rules of engagement detailing target identification, acquisition, and engagement parameters for weapon systems.

During Operation Desert Storm, a joint Air Force, Army, and Marine Corps team worked on developing additional methods, using off-the-shelf technology, to further minimize identification problems. One method, which you may have seen during news coverage of the war, used day-time visual markers such as orange panels shaped as an inverted "tent" on the rear of ground vehicles. Another, for night-time operations, was the use of IR beacons. Some 15,000 were shipped to the Gulf and used to mark tanks and tank fire zones. Although these aided in ground-to-ground

identification of force it did little to assist in the night air-to-ground arena. Many aircraft are not equipped with Forward Looking Infra-Red Radar (FLIR) or other equipment that can make IR light visible.

Current efforts are concentrated on disseminating lessons learned from Operation Desert Storm and exploring the application of promising technologies. The Advanced Systems Concept Office, Army Laboratory Command, is the lead agency for activities involving combat ID of ground forces and is developing plans to focus future efforts in light of lessons learned from the Gulf. The Joint Chiefs of Staff are also conducting a review of military requirements for identification that will encompass hostile, friendly, and Allied surface and airborne platform requirements, as well as civil air traffic control needs. Results should be available by the first quarter of fiscal year 1992.

So as you can see, the Department of Defense is pursuing various methods to improve combat identification and the identification of friendly ground forces in particular.

CAPABILITIES TO SHOOT DOWN ENEMY HELICOPTERS

Senator WALLOP. General Ralston, when Iraqi forces were attacking rebel forces in both southern and northern Iraq, it was suggested that we should shoot down Iraqi helicopters. Understanding that the Air Force is certainly capable of shooting down low-flying helicopters, I understand that it is not at all that easy to detect, acquire, and shoot down low, slow-flying helicopters with high performance aircraft. Would you describe the techniques, tactics, and weapons systems involved as well as the problems in these kinds of engagements?

General RALSTON. Helicopter attacks involve several considerations. [Deleted.]

ATA COMMONALITY FOR INTERDICTION ROLE

Senator WALLOP. General Ralston, depending on how the Navy solves its A-12 replacement dilemma (the A-X program), do you envision that the Air Force might be interested in re-evaluating its need for a next generation replacement for the F-117s and F-111Fs?

General RALSTON. The Air Force still plans to procure a replacement for its current interdiction aircraft by approximately 2010. We will have to evaluate the capabilities of a potential replacement, such as the Navy A-X aircraft, against our interdiction requirements and interdiction force structure.

Senator WALLOP. General Ralston, if the Navy's future medium attack asset were Air Force compatible, would you entertain re-emergence of the ATA?

General RALSTON. Yes. The Air Force will entertain alternatives that satisfy our interdiction requirements. Alternatives will be examined in light of our current force structure, interdiction requirements, and available budget.

Senator WALLOP. General Ralston, how important would some form of commonality with the Advanced Tactical Fighter be in this decision?

General RALSTON. Our recent development of the F-15E air-to-ground variant from the F-15C air-to-air fighter has provided the Air Force an enhanced operational capability with minimal impact to our logistical infrastructure. The end result was increased capability at significant savings. Based on our experience with the F-15E, the Air Force would welcome a degree of commonality between our air-to-air and air-to-ground forces.

ADVANCED TACTICAL FIGHTER (ATF)

Senator WALLOP. General Ralston, could you contrast any differences between how the ATF would have enhanced our capability in the Persian Gulf War versus the alternative designs?

General RALSTON. The advantages of the ATF would not only have come to light during Operation Desert Storm, but also during the Operation Desert Shield deployment. For instance, the ATF would have been able to deploy with less than half the number of C-141s, fly 50 percent more sorties between maintenance, with 30 percent less manpower than the F-15s which supported the Gulf operations. Because the alternative aircraft are based on the same technology as the F-15 and F-16 of today, we would not expect to realize the significant gains in reliability, maintainability, and supportability that is designed into the ATF. In addition, our studies and simulations have shown the ATF to be significantly more effective against the threats we encountered in Operation Desert Storm and far more effective against the future threats we can expect throughout potential conflict regions.

[Whereupon, at 4:05 p.m., the subcommittee recessed and then proceeded into executive session.]

EXECUTIVE SESSION

MONDAY, APRIL 22, 1991

U.S. SENATE,
SUBCOMMITTEE ON CONVENTIONAL FORCES
AND ALLIANCE DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

AIR FORCE ACQUISITION PLANS AND MODERNIZATION REQUIREMENTS

The subcommittee met in closed session, pursuant to recess, at 4:14 pm., in room SR-232A, Russell Senate Office Building, Senator Carl Levin (chairman of the subcommittee) presiding.

Committee members present: Senators Levin, Thurmond, Cohen, and Wallop.

Committee staff member present: Daniel G. Sakura, Research Assistant.

Professional staff members present: John J. Hamre and Michael J. McCord.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; Brian D. Dailey, George W. Lauffer, and Durwood W. Ringo, Jr., professional staff members.

Staff assistants present: Kelli J. Corts, Barbara Gallo, and Julie W. Kemp.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Phillip P. Upschulte, assistant to Senator Glenn; Terence M. Lynch, assistant to Senator Shelby; James M. Bodner, assistant to Senator Cohen; Eric H. Thoemmes, assistant to Senator Coats; Saul H. Singer, assistant to Senator Mack; and Thomas L. Lankford, assistant to Senator Smith.

Senator LEVIN. General, please proceed.

STATEMENT OF MAJ. GEN. JOSEPH W. RALSTON, USAF, DIRECTOR, TACTICAL PROGRAMS, OFFICE OF THE ASSISTANT SECRETARY OF THE AIR FORCE FOR ACQUISITION

General RALSTON. Thank you, Mr. Chairman. I have a presentation I would like to make in more detail in closed session. First of all, when I talk about tactical fighter modernization, I thought it would be useful if we put the overall force structure into context. We have focused on the ATF up to this point, and I will talk tactical fighter modernization not only for Tactical Air Command, USAFE, and PACAF, but the Air National Guard and the Air

Force Reserve, which are full-fledged members of our tactical air forces as well.

TAC FIGHTER MODERNIZATION

[Deleted.]

This red line here represents Air Force TOA or budget for the past 30 years, and this is in constant fiscal year 1990 dollars. As you can tell, it was in this period in the 1970s when we modernized the tactical forces buildup, peaked out in 1985 and has been on a downhill slide since then.

TAC FIGHTER MODERNIZATION

[Deleted.]

This is what that has meant to the tactical fighter force structure. These are number of airplanes over here, and the numbers you see here are the number of wings. We built up to about 38 wings in the tactical fighter force in 1988, and now we are coming down to about 26 wings that you see here. The numbers on this axis are the number of airplanes that you would need to buy per year in order to maintain a constant average age of these forces. For example, for 26 wings we need to buy about 154 airplanes per year to ensure that we keep average age constant of those wings.

TAC FIGHTER MODERNIZATION

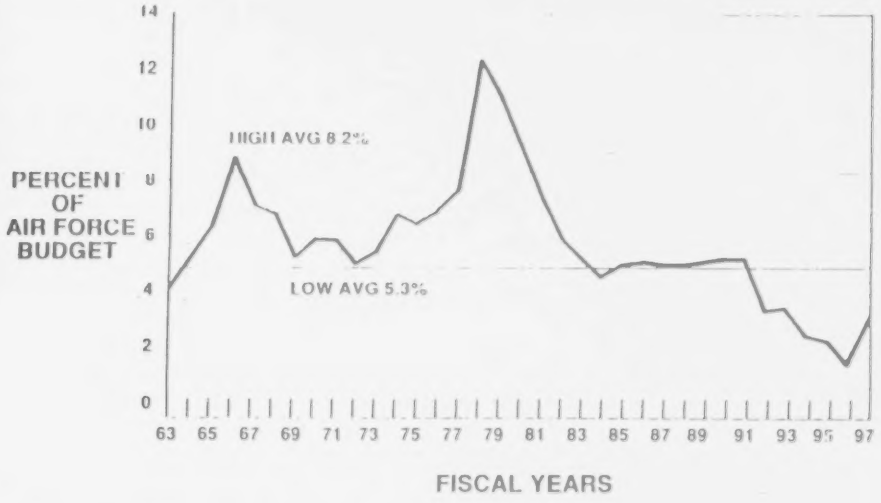
[Deleted.]

The orange bars represent the number of tactical fighters that we have purchased over that same period of time. Notice that it has run along pretty well along that line. There are some notable exceptions. In the 1970s we bought a lot of fighters during the decade of tactical modernization. This is when we bought F-15s, F-16s, and A-10s.

Now you notice in the 1980s buildup it looks a little strange as the number of tactical fighters we bought dipped down actually below the line. This was the decade of strategic modernization, with MX and B-1 and the beginnings of B-2.

Now, as we go out into the 1990s, notice fighter procurement falls off drastically here. There are two reasons for that. One, because of the significant pulldown or drawdown in forces, we are able to relax somewhat on the number of airplanes that we buy, but also because this is the decade of the B-2 and the C-17. From the Air Force point of view, they take a higher proportion of Air Force TOA.

TACTICAL FIGHTER MODERNIZATION



General RALSTON. This is the chart that I showed you earlier, but in a little more detail. Again, since 1963, this line here represents the average 10-year low of about 5 percent. This is what the Congressional Budget Office used in their analysis.

Now this is the average 10-year high of about 8 percent up here. Again notice that we had a couple of peaks. We went up in excess of 12 percent of Air Force TOA during this time period here for tactical fighter modernization. We are well below the 5 percent during the decade of the 1990s, as you see here, but it will be our turn again after the turn of the century when we expect to go up well above the 5 percent of Air Force budget devoted to tactical fighter modernization.

Senator LEVIN. General, John Hamre of my staff says they were using a different data base at the Congressional Budget Office.

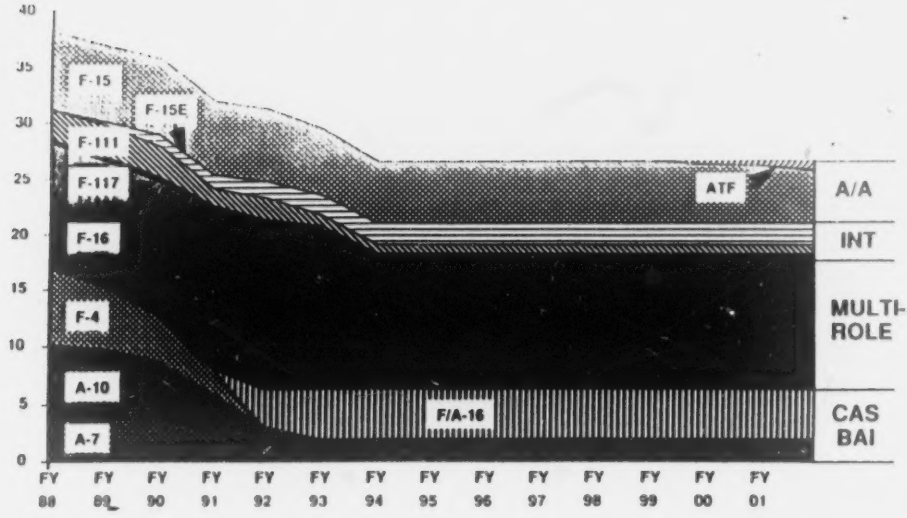
Mr. HAMRE. I believe they meant to represent the average, which would be the line right between those two, General Ralston. I will check that for the record. But they did not try to take the low, to my knowledge; I thought they took the average.

Senator LEVIN. You can get together afterwards and straighten out the record.

Mr. HAMRE. I could be wrong, but I thought they used the average between those two lines.

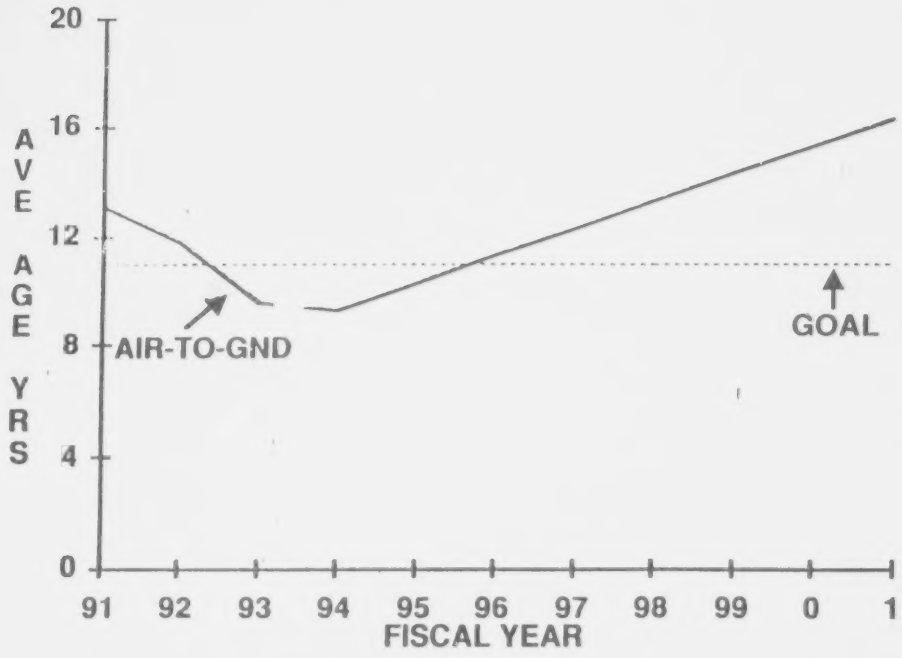
General RALSTON. We can check. It was my understanding it was 5 percent and about $4.2 billion. $4.2 billion is what they had told us they used in their analysis. But we will get together and resolve that.

NOTIONAL
26 WING TACTICAL AIR FORCE



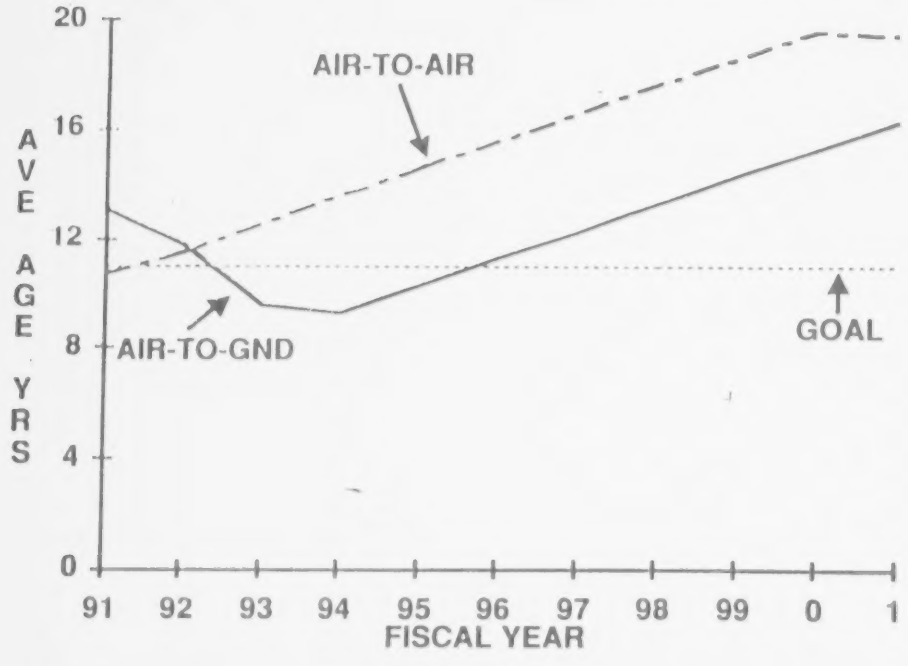
Now, given those constraints, this is what we have had to do with the Air Force force structure. Each color here is a different kind of airplane. Notice over here A-7s, A-10s, F-4s, F-16s. The black line is the F-117. The green line is the F-15E interdiction airplane, and the red line is the air superiority force. We have historically devoted about 25 percent of this force structure to close air support (CAS) and battlefield air interdiction (BAI), and that is what we have here as we draw down. We will have about two wings of A-10s and 3.5 wings of F-16s for the remainder of that CAS/BAI.

FORCE AVERAGE AGE



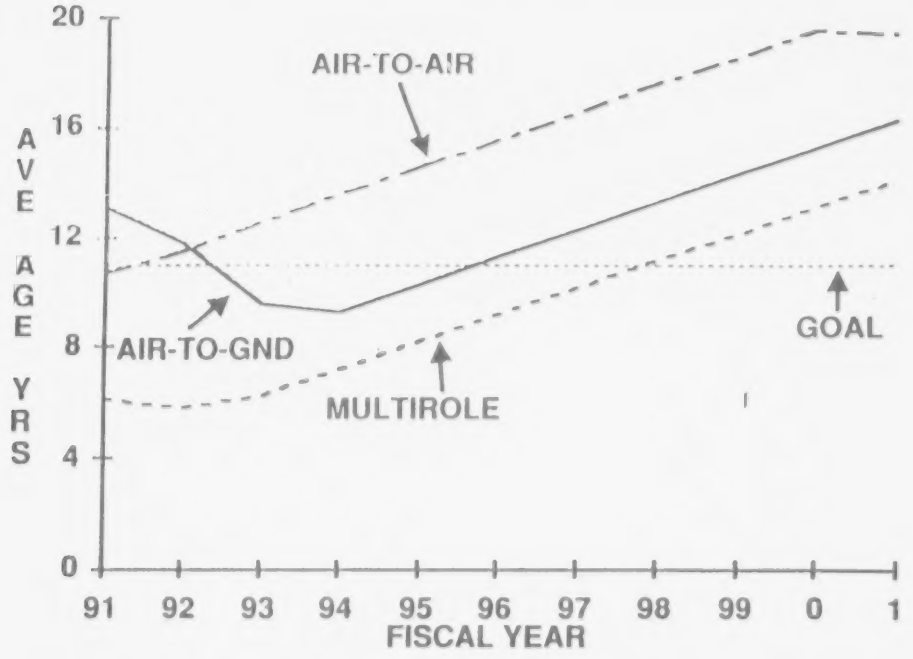
Let us talk average age for a moment and what this results in. This depicts the average age in years on this axis. As we go out across the years, our air-to-ground force, which is our A-7s, our A-10s, our F-4s, our F-111s that we have, they are about 13 years average age today. That is above our goal of 11 years that we have right here. Now there are two ways to drive that average age down. You can buy a whole lot of new airplanes or you can retire a lot of very old airplanes. We have chosen the latter. By retiring our A-7s, A-10s, and F-111s, the older F-111s, we are able to bring that average age down to about 9 years, and we are in pretty good shape through the mid-1990s. But then it starts to go up on a year-to-year average.

FORCE AVERAGE AGE



Our air-to-air force, the F-15 air superiority force up here, our F-15 force today is 11 years old, average age. And it will continue to grow on a year-to-year basis until the ATF comes on line about the year 2000. We will be at almost 20 years average age for our F-15 force when we field the advanced tactical fighter.

FORCE AVERAGE AGE



By contrast, in the multirole force, our F-16s are in the best shape of any of our airplanes. Today we are about 6 years average age, and that will stay pretty constant until we get out to about the 1993-1994 time period, at which time it will then start to age. In 1998, we will be at the same point on our multirole force in terms of average age as we are today on our F-15 force.

Now we would like to modernize all of these forces at one time and keep all these lines down close to the goal, but looking at it from an affordability point of view we cannot do that, and we have to phase that modernization. We have elected to go with the air-to-ground first. That is why the F/A-16 is coming into the force in the CAS and BAI role. The ATF is next, to bring this line down, followed by the multirole fighter sometime after the turn of the century.

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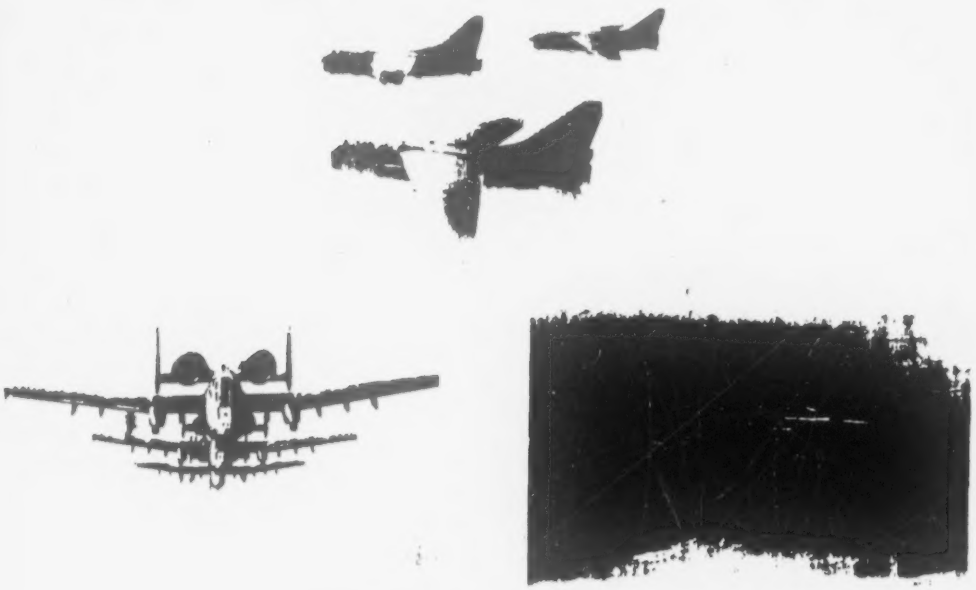
CAS/BAI



CAS/BAI FORCE MODERNIZATION

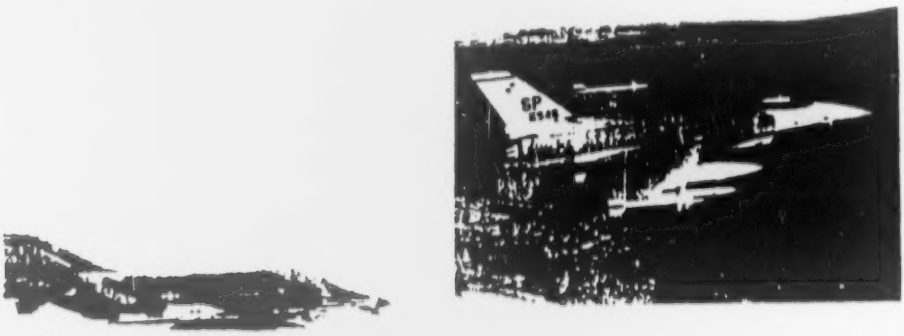
[Deleted.]

I would like to go into each of those mission areas and show you what we are doing. Today we do CAS with A-7s, A-10s, and F/A-16s. We have about [deleted] and that is 72 combat-coded airplanes for the CAS and BAI role. So the [deleted] and we have F/A-16s.

By 1995, we will have retired all of the A-7s. We will have [deleted] of A-10s that will be modernized with the low altitude safety and target enhancement (LASTE) mod. It has a better weapon delivery system. It has a ground collision avoidance system and some other modifications to the force.

Then the bulk, the rest of that [deleted] will be F/A-16s, and again in the budget we have some requests for dollars to put the automatic target handoff system, the PAVE PENNY laser tracker, the 30-millimeter gun pod, all rolled into this red area here.

MULTIROLE FIGHTER



MULTIROLE FORCE MODERNIZATION

[Deleted.]

Our multirole force is composed today of F-4s and its replacement, the F-16. This is where we are today. We have about [deleted]—a few F-4s, mostly F-16s. By 1995, we will be almost out of the F-4 business. We will have a few F-4s left, and F-16s, as you see here, and the F-16s, by the way, we did not retire though there are fewer wings. We did not get rid of any F-16s. The difference is they went from the multirole force into the CAS and BAI role. We did not send them away. We just took them out of the multirole force and put them into the CAS and BAI role.

INTERDICTION

INTERDICTION FORCE MODERNIZATION

[Deleted.]

Our interdiction force today is composed of F-111s, the F-117, and the F-15E. We have almost [deleted] today. They are composed of less than a wing of F-15Es. We have less than a wing. We have two squadrons at Seymour Johnson of F-15Es, new ones. About a [deleted] of F-117s. And the bulk of the interdiction forces are composed of the F-111D, E, and F. In 1995 we will retire the older F-111Ds and Es, and we will have only the F-111F left in the force. That is the newest one, and we will have less than a wing of those; [deleted] and by that time we will have fielded [deleted] of F-15Es.

AIR-TO-AIR FIGHTERS
F-15

AIR-TO-AIR FORCE MODERNIZATION

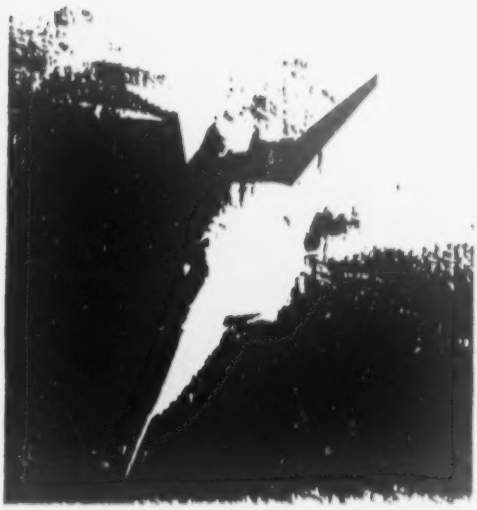
[Deleted.]

Our F-15s you see here are our air-to-air aircraft. Today almost [deleted] composed of F-15Cs and Ds, which are the latest models. The As and Bs are the early ones. We would draw down part of that force to [deleted] by 1995, and then we will replace those [deleted] with the ATF in the future.

So this is where the advanced tactical fighter (ATF) fits into this force structure.

AIR-TO-AIR FIGHTERS
ATF

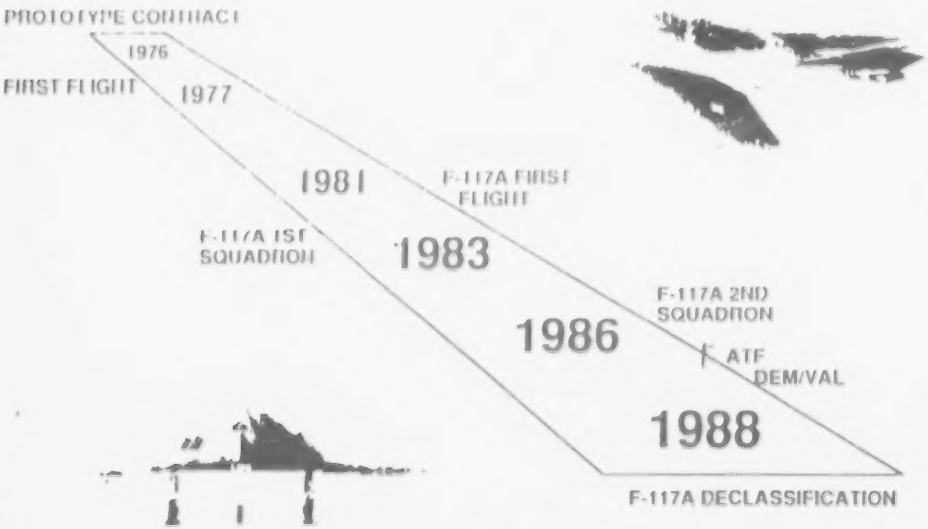
YF-22



YF-23

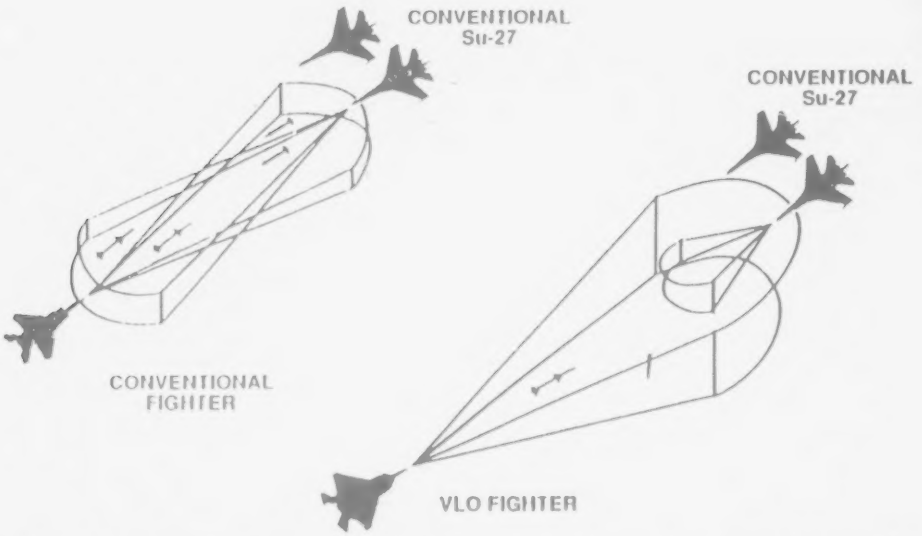
Here is a picture of the YF-22 and YF-23. This is the Lockheed, Boeing, and General Dynamics aircraft; this is the Northrop-McDonnell Douglas aircraft.

U.S. L/O FIGHTER HISTORY



One of the areas that is of great concern to us is the low observable arena. We have seen our technology in the past flow from the west to the Soviets and to other western industrial nations. One thing that is of concern to us is we normally think of our F–117 as a very new airplane; well, in actual fact, the F–117s prototype flew for the first time in 1977. By the time we field the ATF in the year 2002, the F–117 will have been airborne for 25 years, and, while we would like to think that that technology will not have migrated to the other side, if past experience is any indicator, it will have.

WHY VLO SIGNATURE?



That brings up the reason that we need a very low observable signature for the ATF. Today we have what is called a conventional fighter here, and this blue cone represents his radar. In the case of the red, this is a Soviet SU–27. The red area indicates his radar area of coverage. As you can see, we are at parity today with the SU–27. Now in aerial combat, whomever sees the other guy first gets the kill. In World War I, it was whomever had the best eyesight got the most kills. Today, it is whomever has the most effective radar and can most effectively employ that radar has the best chance of getting a kill.

Now if we built a very low observable fighter, what that does is dramatically reduce the effectiveness of the enemy radar. We are able to see him, get the first shot, the first kill, and we have not yet penetrated the area where he can see us.

Senator COHEN. General, do you have a chart which shows what their anticipated improvements are going to be comparable to what we have today? In other words, does the intelligence community tell you what they have on the line, what they are likely to build during the same period of time, so you have a somewhat different chart up there?

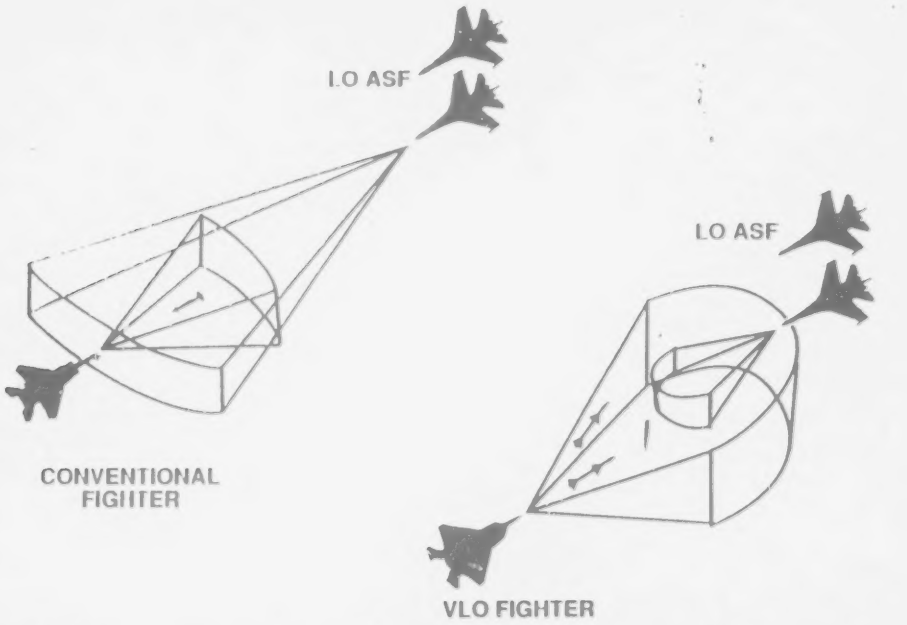
General RALSTON. Senator, we have that, but we cannot go into it in this room today. But I would be happy to get with you at your convenience and go into that intelligence.

Senator COHEN. I think everybody would be interested in that.

Senator LEVIN. That chart, then, does not reflect the intelligence assessment?

General RALSTON. I will show you that in a moment. Let me show you the next chart.

WHY VLO SIGNATURE?



This is assuming a low observable ASF, and, while I cannot go into the levels, I can tell you in general terms that it does this to today's F-15 radar: it gives him the advantage. He can see us, get his red missile in the air, and we have not yet been able to even tell that he is out there.

Now, what we want to do is build a very low observable fighter. We have the advantage in low observables. We need to exploit that advantage—go ahead and let him build his low observable ASF. And while you can see here, Senator Wallop, the overall engagement area is smaller than what we have had in the past, we still have the advantage. We want to see him out there and get first look, first shot, and first kill. But we have to accept the fact that the battle arena is smaller. We may very well get into a dogfight, and we need superior maneuverability on this airplane as well as stealth technology.

ATF STATUS

- ATF HAS COMPLETED WHAT THE AIR FORCE CONSIDERS A HIGHLY SUCCESSFUL DEMONSTRATION/VALIDATION DEM/VAL PROGRAM
- THE RESULTS ARE A BALANCED ATF DESIGN THAT INCORPORATES AN ACHIEVABLE AND AFFORDABLE MIX OF:
  - LOW OBSERVABLES
  - HIGH MANEUVERABILITY
  - SUPERSONIC CRUISE
  - LONG RADIUS OF ACTION WITH EXCELLENT PAYLOAD
  - HIGHLY RELIABLE INTEGRATED AVIONICS
- DOWN SELECT IS IMMINENT
- MILESTONE II DEFENSE ACQUISITION BOARD REVIEW IS SCHEDULED FOR JUNE
- AIR FORCE HAS COMPLETED THE ALTERNATIVE STUDY

Now we have just gone through what we consider to be a highly successful demonstration and validation program. We have a balanced ATF design that strikes a balance between the stealth technology, the high maneuverability, more maneuverable than today's airplanes, the ability to fly supersonically without using the afterburner. That gives you better range. That lowers your infrared IR signature.

We have a long radius of action with excellent payload with the ATF, and highly-reliable integrated avionics. All of these are packaged in a very reliable and maintainable airplane. That is very important to us, the high reliability and high maintainability.

Our downselect is imminent. As we speak today, the final briefing is going on with the source selection authority, and if they stay on track, we should have an announcement tomorrow after the stock market closes on the winner of this competition.

We have a Defense Acquisition Board scheduled for June, and we would like at that point to get on with full-scale development of the airplane. This committee asked us to do an alternative study. We have done that, and I would like to show you some of the results of it.

BASIS FOR ATF ALTERNATIVE STUDY

- FY 91 SENATE ARMED SERVICES COMMITTEE LANGUAGE:

> "... THE COMMITTEE BELIEVES THAT THE DEPARTMENT OF DEFENSE MUST CONDUCT A MORE COMPREHENSIVE EVALUATION OF AIR FORCE AND NAVY TACTICAL AIR MODERNIZATION, TO INCLUDE CLOSE AIR SUPPORT AND MULTIROLE AIRCRAFT, AND NOT LIMIT THE ANALYSIS TO ATF PERFORMANCE REQUIREMENTS ONLY.... PRELIMINARY ANALYSIS ILLUSTRATES THAT WITH THE DEVELOPMENT FUNDS EARMARKED FOR THE ATF, IT WOULD BE POSSIBLE TO DEVELOP THE F-15XX FOR AIR SUPERIORITY, DEVELOP A MODERNIZATION PROGRAM FOR CLOSE AIR SUPPORT AND LAUNCH AN UPGRADE PROGRAM FOR THE F-16..."

Just to refresh you, this is last year's language, where you asked us to do a comprehensive evaluation of our tactical air modernization, to include close air support and multirole aircraft, as well as the ATF.

ALTERNATIVE STUDY

- ALTERNATIVE STUDY UNDER THE DIRECTION OF TACTICAL/AIRLIFT PROGRAM EXECUTIVE OFFICER
  - F-15XX (MCAIR) WORKING WITH F-15 PROGRAM OFFICE
  - FALCON 21++ (GD) WORKING WITH F-16 PROGRAM OFFICE
- ASD ASSEMBLED AN INDEPENDENT ENGINEERING AND COST TEAM TO EVALUATE BOTH AIRCRAFT PROPOSALS
- AF STUDIES & ANALYSIS IS INDEPENDENTLY EVALUATING EFFECTIVENESS OF BOTH DESIGNS
- FINAL RESULTS WERE REVIEWED WITH RESPECTIVE CONTRACTORS

CONTRACTORS CONCUR WITH ALTERNATIVES STUDY

As we approached this alternative study, as I mentioned in open session, it has been very, very important to us that we do this in an objective manner and in a manner that could withstand scrutiny. We took the program and we put it under the Tactical Airlift Program executive officer at Wright-Patterson, who is responsible for the F-15, the F-16, and the ATF.

We had a proponent for the F-15, the F-15 program office, work with MCAIR to get the best design that MCAIR was capable of producing. We had the F-16 program office work with General Dynamics on the Falcon-21++ to do the same thing with the F-16 derivative. The Aeronautical Systems Division assembled an independent engineering and cost team to evaluate those alternatives, and our own Air Force Studies and Analysis has done the effectiveness of all of the designs. We have reviewed the final results with the prospective contractors and the contractors concur with our alternative study.

F-15XX

[Deleted.]

This is a brief look at the F-15XX. As you can tell from physical appearance, it does not look too much different from an F-15, but it has a significantly larger wing. It has ATF engines. It has ATF avionics. It has an active electronically-scanned array radar, which is important to its avionics. And they have done the best job they

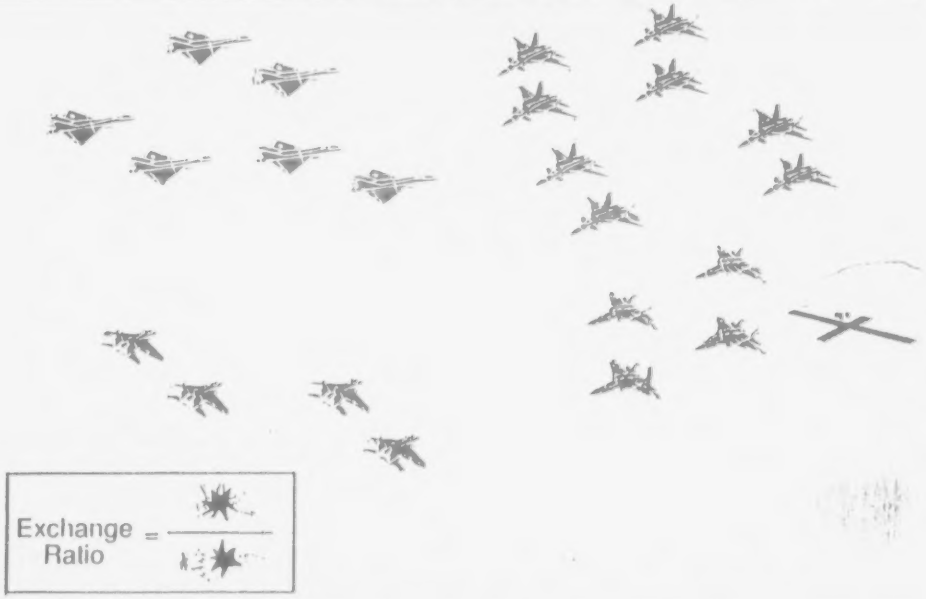
can to reduce the signature of this F-15, keeping in mind it is a very difficult thing to do to get all aspect signature reduction. You cannot do that in an existing airplane, and because of the large inlets and some other factors, the fact that the missiles have to be carried external to the airplane, they are unable to get close to the levels of stealth technology that we have in the ATF.

FALCON-21++

[Deleted.]

This is the Falcon-21++, and you can see it is a more radical change to the F-16 than what the F-15XX is to the F-15. It has a completely new wing, you see here. It has a new fuselage. The AMRAAM missiles, for example, are carried internal to the F-16 fuselage. In addition, it has an ATF engine. It has an active array radar with ATF avionics, and it has as much low observable treatment as could be placed on an airplane like that.

AIR-TO-AIR SCENARIO



There are a lot of ways of evaluating how an airplane will perform in the air-to-air arena. That is a difficult thing to assess. We have done the best job we can with our models, and this shows a typical scenario.

Red airplanes are bad guys. These are today's MiG-29s, four of them, and here are eight Soviet air superiority fighters (ASF) that will come in about the turn of the century. On the blue side, we have four F-15E interdiction bombers and the ATF's mission is to get those F-15Es to their target, let them deliver their bombs and get back home. We have six ATFs to perform that mission.

So it is a 12 versus 10 scenario. We measure exchange ratios by how many red airplanes are killed versus blue airplanes. Now this

is a very complex computer exercise. It takes about four hours to run one of these engagements. We have run 30 different engagements for each airplane. That has been done independently by the people at the Aeronautical Systems Division. It has been done by the contractors, and it has been done by Air Force Studies and Analysis. So we have something in excess of 1,200 hours of computer time alone looking at the effectiveness of this exercise.

Senator LEVIN. Were the stealth characteristics of their force based on intelligence reports?

General RALSTON. Yes, sir. This is based on a validated intelligence threat assessment that is validated by the Defense Intelligence Agency, with input from the CIA, the NSA, the DIA, as well as the Air Force.

Senator LEVIN. So that is what it is for the year 2000?

General RALSTON. That is exactly right.

Senator LEVIN. That is what you are modeling?

General RALSTON. That is what we are modeling here. These are real airplanes here that we know, and these are what the intelligence community says their ASF will be.

EXCHANGE RATIO

[Deleted.]

I have tried to boil down a lot of analysis to an understandable form here. What this is is the exchange ratio over here versus the various alternatives. I have assigned the ATF performance a value of one. Now, the F-15C of today, our best F-15, in that scenario gets about [deleted] the number of kills that ATF gets. The F-15XX gets a little less than [deleted] of the kills of the ATE. And the Falcon-21++ gets about [deleted] of what the ATF does.

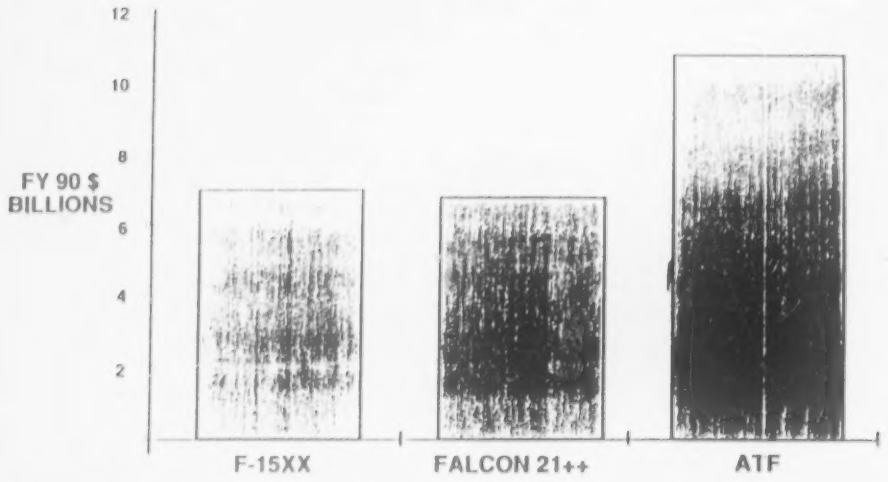
Now there are some risks in this analysis. These two airplanes, the F-15XX and the Falcon-21++, are very much on the knee of the curve, borderline of what can be achieved in terms of stealth technology with an existing airplane. If the contractors failed just slightly to get that level of signature, it very quickly drops back to this area right here. We are confident of the ATF because we have built it, we have flown it, we have measured its signature, and we are very confident that we can make what we see here.

SA-LAUNCH OPPORTUNITIES

[Deleted.]

That measures the offensive capability. Let's look at another look at how does it perform against surface-to-air missiles. This is an SA-12. This is the best Soviet missile that we have information on right now. This is an F-15XX flying into the vulnerable area of that SA-12. This represents the area where the F-15XX is vulnerable to be shot down by an SA-12. Notice he has a little bit bigger envelope in the front, and that is because of the kinematics of flying into the radar. This is the Falcon-21++, and you can tell from a practical point of view it is not significantly different from the F-15XX. But the ATF, with its all-aspect capability, has only a very small area where it would be vulnerable, and as the airplane flies over the site and goes away it has no capability at all.

FULL SCALE DEVELOPMENT COST



Let us look at the cost associated with these alternatives. This represents the cost of the ATF—full-scale development cost now—and these are apples to apples. These are fiscal year 1990 dollars remaining to be spent. The ATF is about $11 billion in terms of full-scale development cost to go. The F-15XX and the Falcon-21 are essentially $7 billion in R&D to get to that airplane.

Senator LEVIN. Is that a secret classification?

General RALSTON. No, sir. There is nothing secret about this.

Mr. HAMRE. Are the numbers sensitive as to contractor numbers?

General RALSTON. Only when we get below this level. In other words, if you asked me what went into that $7 billion right there and I have to start giving you a breakdown, we would prefer the contractor not have that because then it takes away our negotiating leverage. They understand what percentage goes to other government costs, to test costs, and they can see what you put into our budget on a yearly basis, and it takes away our negotiating leverage on what we can get from them in our negotiations.

Senator LEVIN. But the total cost is not?

General RALSTON. The total cost is not.

Senator LEVIN. So $7 billion compared to $11 billion is not a sensitive number?

General RALSTON. That is not a sensitive number. We have told the contractors. Now, one of the contractors did, for example, when they figured out what the F-15XX would cost, they assumed, for example, that somebody gave them an ATF engine. We said no. If the ATF program was canceled and this is the alternative, you have to carry the cost of developing that ATF engine the same as the ATF program would do. So we took the dollars, dollar-for-

dollar, from the ATF and assigned those to the F–15XX. The same is true of the ATF avionics. If that is not developed by the ATF program, the F–15XX or Falcon-21++ would have to carry the costs for those.

Senator LEVIN. But, going back to an earlier chart, you had the ATF as one and compared the other alternatives at [deleted] and something else. What is the exchange ratio on kills between ours and theirs?

EXCHANGE RATIO

[Deleted.]

General RALSTON. This one right here depends on the scenario. But let me say this one would be [deleted]. We would kill [deleted] of theirs for each [deleted] of ours. This was about [deleted].

Senator LEVIN. What would the Falcon be, then—[deleted].

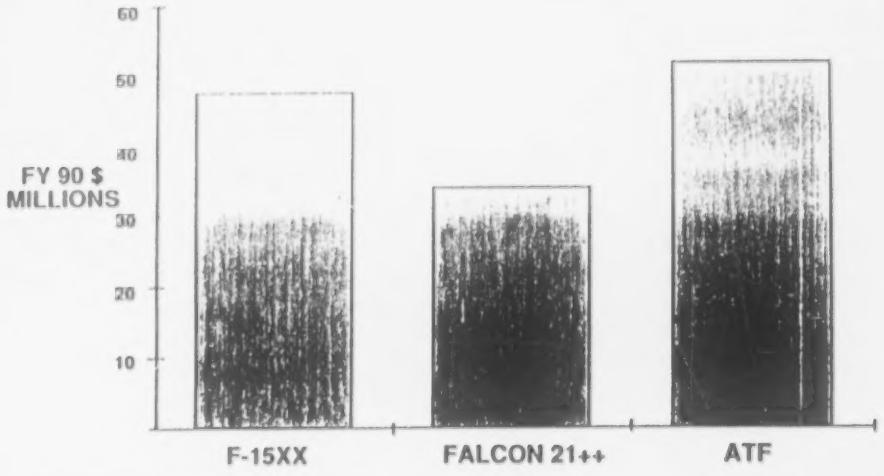
General RALSTON. [Deleted] under this given scenario. Now there are other scenarios that you run where this becomes 26 or 27, and the others corresponding by lower.

Senator LEVIN. That is again based on intelligence reports of their expected capability in the year 2000?

General RALSTON. Exactly. Approximately 2000—1998–2003, but approximately 2000. Now that was the full-scale development dollars required. It is about a $4 billion delta.

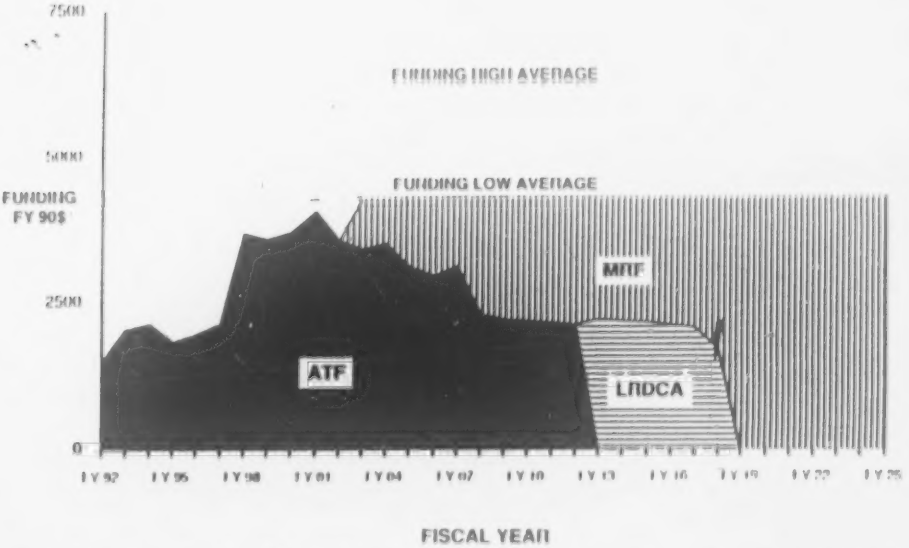
Now our people also will tell you that they are far more confident in the cost numbers for the ATF than they are in the cost numbers for the F–15XX and the Falcon-21++, and that is somewhat understandable. We have spent $5 billion on the ATF program to date in conjunction with the contractors in building the hardware, flying the hardware, flying the engines. We have not done that with the paper designs for the F–15XX and the Falcon-21++. So I think there is considerably more cost risk to the alternative airplanes.

PRODUCTION FLY-AWAY COST



This is the production flyaway cost, and again in fiscal year 1990 dollars, the ATF is slightly over $50 million in flyaway cost. The F-15XX goes about $48 million. So it is essentially a wash, within our ability to estimate, on the flyaway cost.

AFFORDABILITY



We have talked about ATF affordability in the other hearing, but let me emphasize again we have taken the costs on the ATF—this

is the 650 ATFs—as best we know how to cost it. In the 1990s, we are well below the 5 percent line which has been our historic 10-year low.

The bulk of the funding did not go to tactical fighter modernization. Again, this is going to B–2s and C–17s in the 1990s. We bring on the multirole fighter in this time period. We modernize our interdiction force out on the 2012 timeframe. In our view, that is all doable if we make an assumption that this multirole fighter is anywhere in the ball park the same cost as today's F–16.

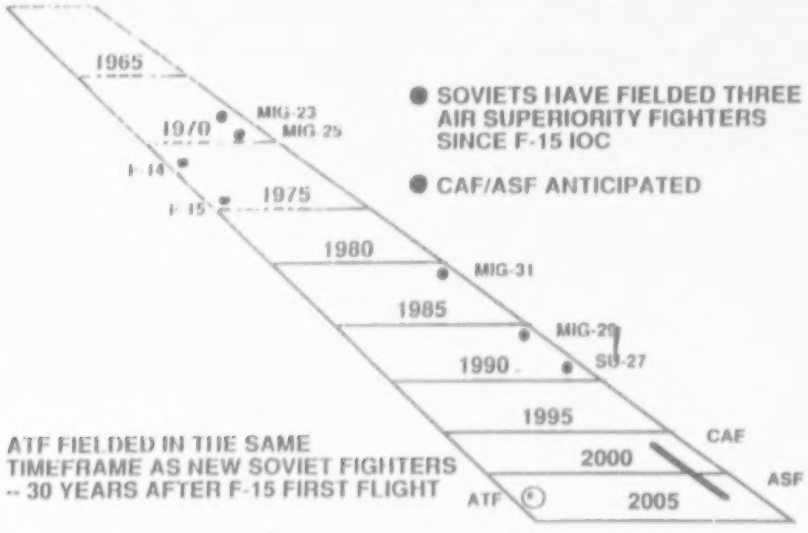
ALTERNATIVE STUDY CONCLUSIONS

- ALTERNATIVE STUDY HAS COMPLIED WITH FULL INTENT OF CONGRESSIONAL LANGUAGE
  - BOTH F-15XX & FALCON 21++ HAVE BEEN EVALUATED AGAINST THE AIR-TO-AIR MISSION
- EMPHASIS FOR BOTH AIRCRAFT DESIGNS WAS ON MAXIMUM REDUCTION OF RADAR CROSS SECTION
  - CONCLUSION: LOW OBSERVABILITY IS REQUIRED FOR AIR SUPERIORITY MISSION
- STUDY RESULTS SHOW ATF IS FAR MORE CAPABLE OF ACHIEVING AIR SUPERIORITY AGAINST AN EVOLVING THREAT
- ALTERNATIVES DO NOT APPEAR TO BE A LOW COST ANSWER FOR MODERNIZING THE AIR-TO-AIR FORCE
- ATF IS AFFORDABLE IN A CONSTRAINED BUDGET WHILE MODERNIZING CAS/BAI, AIR-TO-AIR, AND MULTIROLE FORCES

Sir, in conclusion, I would say at least from our viewpoint we think that we have complied with the intent of your direction from last year. We have taken a very serious look at the alternatives. We evaluated them not against the ATF specifications but against the air-to-air mission requirement. The emphasis for both aircraft designs was on maximum radar cross-section reduction. That was a conscious decision on the part of the contractors, and their analysis bears that out.

The study results show that the ATF is far more capable of achieving air superiority against the evolving threat. The alternatives do not appear to be a low-cost solution for modernizing the air-to-air force, and in our view, ATF is affordable in a constrained budget, while modernizing our close air support, our battlefield air interdiction, and our multirole force.

AIR SUPERIORITY FIGHTERS



I would like to leave again showing that when we brought the F-15 in in the early 1970s—and I went to the first flight of the F-15, which was in July of 1972, so our F-15 that we think of as being a very modern fighter today has been airborne for 19 years, and by the time ATF comes on board, if it stays exactly on the schedule that we have outlined and you give us every nickel that is requested, in the year 2002, that F-15 will have been flying for 30 years.

And the Soviets have built the MiG-31, the MiG-29, the SU-27. They have the counter air fighter follow-on to the MiG-29, the air superiority fighter, a follow-on to the SU-27 coming in around the year 2000. We are also concerned, I might add, with other western nations that are certainly upgrading their fighter aircraft, and they are very likely to sell those to potential hot spots around the world that we would have to counter.

Mr. Chairman, that concludes our presentation.

Senator LEVIN. I do not have any questions on this particular presentation. Senator Wallop? Senator Thurmond?

Senator THURMOND. No questions, thank you.

Senator LEVIN. On another matter, I have a question on the AMRAAM. We have heard reports that we are going to be getting a budget amendment coming back on AMRAAM. I am wondering if that is right. Do you know?

General RALSTON. Mr. Chairman, that is my understanding—that the Department of Defense will be sending an amended budget over that will cut back slightly on the number of AMRAAMs requested in fiscal year 1992.

Senator LEVIN. Why are we cutting back? If we have such a big backup of missiles on order, why not just skip a year?

General RALSTON. It is a very complicated answer. I will try to simplify it. The contractors are somewhat behind, although not a

lot. The Hughes Company, for example, has delivered 34 missiles in March versus what they had planned, which was about 30. They have done very well for the last 4 months, and in our judgment they will be back on schedule very quickly.

Raytheon is somewhat behind in their deliveries. We should have accepted about 900 missiles in the Air Force to date. We have accepted about 500. So we are slightly behind in terms of missiles.

But the real issue is with the vendors. If we do not buy missiles in fiscal year 1992, we will wind up having a gap in our vendor production base and that, in the long run, will certainly cost us far more to go back and requalify and restart those vendors than if we kept them going at some minimum level of missile production.

Senator LEVIN. Okay. On the Mark-15 IFF system, this has been canceled again. Is it because of affordability or it just was not working well?

General RALSTON. There are several reasons, but when you ask is it not working well, I do not think anyone has a quarrel with the performance of the Mark-15 as it was designed and as it was speced. I do not believe that was an issue at all.

The issue is in the Air Force's priority, and maybe General Hawley can address this as well from the ops point of view. The number one priority for the tactical air force is hostile identification. We want to know who the bad guy is so you can shoot at him. IFF, no matter how capable, is what we call a cooperative system. It tells you if the guy is either a friendly or an unknown. It does not tell you conclusively that he is hostile.

In addition, affordability was a major player. It was an expensive program and in the overall priorities, when the warfighters racked them up, it did not score as high as other high-priority items. Third, there was less than desired NATO participation in Mark-15, which was the whole purpose of Mark-15 in the first place.

Senator LEVIN. So even if it were a cheaper system, it was not conclusive enough in its identification so that would be ordering it? Is that a fair statement?

General RALSTON. That is a fair statement. General Hawley might want to add to that.

STATEMENT OF MAJ. GEN. RICHARD E. HAWLEY, USAF, DIRECTOR, OPERATIONS, OFFICE OF THE DEPUTY CHIEF OF STAFF FOR PLANS AND OPERATIONS

General HAWLEY. I think General Ralston has covered the issues very well. A major factor was lack of confidence that a substantial number of allied aircraft could be equipped with the system, which makes it less than useful, and our desire to focus on non-cooperative systems that will allow us to identify hostiles, which is our real objective, particularly in the air superiority arena.

Senator LEVIN. Finally, what kind of initiative are we taking in this budget to try to address the issue of friendly fire? We saw how easy it was to attack one of our own ground vehicles in Operation Desert Storm. What initiatives are we undertaking to try to reduce that risk?

General RALSTON. Again, I would like to have a joint answer, if I could, and have General Hawley address that. But certainly the 13

friendlies that were killed by friendly fire was a tragic situation, and I do not want to minimize that in any regard. We do not want any people killed by friendly fire. But I might add out of those two incidents there were literally tens of thousands where the procedures worked fine and that did not happen. While it is regrettable, I think overall it performed very well. That does not mean that we want to stop working the problem, and we will look at several innovative ways both from a technology point of view as well as operational procedures. I think maybe General Hawley could add something to that.

Senator LEVIN. I agree with you. That is why I talked about reducing risk, if not eliminating risk. We probably never will do that. We have done very well, but we still want to improve it, if we can. Are there any initiatives to reduce the risk further in this budget?

General HAWLEY. Yes, sir. Well, I hesitate to say in the budget. We have efforts ongoing in the study area. I am not sure you would find it in the budget. During Operation Desert Storm, and the buildup to Operation Desert Storm, we worried about this problem and went to work with the Army on how to minimize the risk. A couple of things came out of it. One was an [deleted] that would help pilots identify friendly vehicles. And, of course, [deleted] that you saw in some of the news coverage on vehicles was designed to do the same thing. Both of the incidents that occurred were at night, the most difficult environment we have to work with from the standpoint of this risk. We have an effort ongoing with the Army and the other services now to explore other options that we can do to field some kind of a system that would further reduce the risk of friendly casualties.

Senator LEVIN. Senator Wallop.

Senator WALLOP. It is my understanding we took AMRAAM to Operation Desert Storm. Is there any report on it? Were we able to use it?

General RALSTON. Yes, Senator. We did in fact take AMRAAM, and I would like to spend a little time talking about that. Unfortunately, the timing of Operation Desert Storm was not good for us. We were just receiving our missiles in December of 1990 for the first unit.

Unfortunately, that unit deployed to Saudi Arabia in August, and they were over there in place. While we considered sending the missiles over there as soon as we got them, it was the view of the warfighters, properly so, that introducing a new system with new software and new symbology for the pilots just as they were getting ready to enter combat was probably an undesirable thing to do. They elected to do the best they could with the existing AIM-7 missile.

Now, after the initial days of the war, we ran into some problems with the Iraqi fighters trying to flee to Iran, and they were very difficult to chase down with our existing AIM-7 missile. So General Horner asked that we send AMRAAM over. And in fact we did. We immediately deployed 52 AMRAAM missiles to Saudi Arabia.

The 33rd Wing from Eglin Air Force Base, who had some pilots who had some familiarity with AMRAAM, although not a lot, chose to carry the AMRAAM missiles. And they worked very well from a reliability point of view. We accumulated over 2,300 hours

on those missiles during Operation Desert Storm. We had two failures. That gives us better than 1,150 hours mean time between failure, and all we are hoping for at the mature level of the missile is 450 hours. So we exceeded that by a large amount. At this point in the program, we are only expecting about 200 hours mean time between failure to be on the growth curve. So we felt very good about the reliability data that we got off of AMRAAM in Operation Desert Storm. I will say, unfortunately, the enemy stopped flying about the time AMRAAM got there, and we did not have an opportunity to fire AMRAAM in actual combat.

Senator WALLOP. I have to say that our visit to El-Kahar was one of the more fascinating parts of the whole trip. I was impressed by the statements of the pilots as to how much innovation was going on all the time, literally redesign of uses of communications, of equipment, and everything else.

I wonder if in retrospect—and I am not asking anybody to make a judgment as to whether it was a right idea or wrong idea to delay it; I think I would have done the same thing or would have expected the same thing—but in retrospect, with the experience that was gained of the capabilities of your pilots to innovate, would it not probably in the future be a good idea to go ahead and move the advanced technology in?

General RALSTON. I think in general terms certainly, and I think we did that with the JOINT STARS aircraft, for example.

Senator WALLOP. That was one of the ones in particular.

General RALSTON. JOINT STARS was very, very early in its development, several years before even a production decision, and we made the judgment let's go ahead and get that technology over there because of the need, and it worked out extremely well. I think maybe General Hawley could address perhaps the AMRAAM issue.

General HAWLEY. We evaluated each system on a case-by-case basis, worked with the theater and CINC staff on whether or not they felt the system was required, and whether it would meet a valid requirement in the theater. In AMRAAM's case, we had some software to load and refine into the aircraft, the 33rd Wing's aircraft, that was still in progress right up through January, when we kicked off the air war. So that one, the timing, as General Ralston pointed out, was not very good for that system. But we certainly were not reluctant in many areas to introduce prototype systems, systems in development. That was particularly true in many of our intelligence systems, where we introduced essentially prototype systems in order to get real-time intelligence into the units.

Senator WALLOP. We got rave reviews of JSTARS after a first little while. They said it was extremely complicated to get it underway, and then they literally redesigned its operation in the air. But, gosh, it was pretty impressive.

General RALSTON. I think there was a team effort on the part of the users at Tactical Air Command, the contractors, and the developers in Systems Command. It was really a team effort all the way. They deployed over there with Ph.D.s on board JOINT STARS to do the software work while the airplane was flying. They did a tremendous job. I do not want to leave you with the impression that it was easy to do.

Senator WALLOP. They did not. They explained how difficult it had been.

General RALSTON. But the results were very encouraging.

Senator WALLOP. One last thing, Mr. Chairman. I hope, General Ralston, you do not abandon one of the arguments you made in open session today—and that is had we listened to the same arguments against the F-15 that were cast in the days of the F-4, we would have been fighting this war with F-4s. It is important, I think, that we hold some technological vision out there, especially when it is probably the best weapon America has. Thank you, Mr. Chairman.

Senator LEVIN. Thank you. Senator Thurmond.

Senator THURMOND. General Hawley, I am a little hoarse. I hope you can hear me.

General HAWLEY. Yes, sir, I can hear you fine.

Senator THURMOND. Considering the Operation Desert Storm experience, could the Air Force support another Operation Desert Storm with the 26 tactical wings envisioned for 1995?

General HAWLEY. Yes, sir. As you know, our planning guidance calls for us to size the force to meet [deleted] similar to an Operation Desert Storm conflict. Our efforts indicate that with a 26-wing force and with the authority to mobilize the Reserve forces for the second contingency, we can handle both contingencies within the 26 wings.

Senator THURMOND. General Hawley, the F-117 was one of the success stories in Operation Desert Storm. Would the F-117 have been as successful had the Iraqi air force managed an effective air campaign?

General HAWLEY. Yes, sir. We have looked extensively at the results of the F-117s work in Operation Desert Storm. There were attempts on the part of the Iraqis to counter that system, and it performed very well. It would have been equally effective even if they had increased those efforts. But I would note that it was our air superiority that gave us the ability to achieve the very, very low level of combat attrition that occurred in Operation Desert Storm, and I encourage the committee to support the ATF because it is the airplane that will give us that same kind of air superiority in the future.

Senator THURMOND. General Ralston, I want to ask you about the A-10. I was not here when you went into that. As I understand it, you are going to phase the A-10 out except for [deleted] wings.

General RALSTON. Yes, Senator. We would keep [deleted] wings in the close air support role. We would have another almost two wings in the forward air controller role. So we would keep something close to [deleted] airplanes—[deleted]—in the force structure.

Senator THURMOND. What are you planning to replace the A-10 with?

General RALSTON. We would put the F/A-16—and that is an F-16 that is optimized for the CAS and BAI role—into that role that was previously performed by the A-10.

Senator THURMOND. From what I understood, the A-10s did a pretty good job in the Persian Gulf. Is it wise to reduce the A-10 force structure?

General RALSTON. Senator, let me put it this way. The A-10 performed in the Gulf exactly as we thought that it would. It did a very, very fine job. But that was because we were able to suppress the defenses through our air superiority and through our other means.

Now I might add, as well as the A-10 performed—and it did perform very well in those areas where defenses had been sufficiently reduced—but when we tried to send the A-10 against the Republican Guard, the first time we did that we lost two A-10s and had another one that was badly damaged. At that time, the air commander pulled the A-10s back away from the Republican Guard and sent them into the areas where the defenses had been more suppressed. So while it performed very well in those areas that it could operate in, I do not want to mislead you. There were areas over there that we could not operate the A-10 in support of our troops, and we had to send in the F-16s and the F-15Es into those areas to support our troops.

Senator THURMOND. As I understand it, if you had a different threat, the A-10s probably would not survive?

General RALSTON. If it is a very hostile defensive threat, we would not want to send the A-10s into that threat.

Senator THURMOND. Is that because of the slow speed of the A-10?

General RALSTON. That is the primary reason for it. We think the speed of the F-16 is what will enable it to avoid the threats and survive.

Senator THURMOND. Thank you, Mr. Chairman.

Senator LEVIN. Thank you, Senator Thurmond. Just a couple more questions. On the AMRAAM, you indicated that we have accepted 500 missiles. How many are on order?

General RALSTON. Let me do a quick calculation. We have 900 missiles from Lot 3. We have about 400 missiles from Lot 2. That is 1,300, 180—about 1,480 missiles are on contract. We have Lot 4, which is the fiscal year 1990 buy, for about 900 missiles that is ready to go as soon as we get clearance from the Office of the Secretary of Defense to award that contract. They are on long-lead contract at this time and have not been delayed in their delivery to this point, but we are getting to the point that we need to get on with that contract. We have another, the fiscal year 1991 buy, in which you authorized us 900 missiles and we only got enough money for about 735. That is in Lot 5. We want to get on with that contract also this summer. So, to answer your basic question, we have about 1,480 missiles on contract at this time.

Senator LEVIN. A total of how many?

General RALSTON. Again, there are another 1,800 missiles authorized by Congress, but those last two lots, that 1990 and 1991 lot, are not on contract at this time.

Senator LEVIN. And that would total 3,200?

General RALSTON. Approximately.

Senator LEVIN. On the F-16s, you made reference to foreign military sales as a way of keeping that line going for a couple of years perhaps. How confident are we of foreign military sales on the F-16?

General RALSTON. We are optimistic on some foreign military sales, but I have to tell you that that is not completely under our control. When you are dealing with another country, you are always uncomfortable until the contract is signed.

Senator LEVIN. Do you think it is likely that foreign military sales will keep that line going for an additional 3 years or so?

General RALSTON. I think foreign military sales will certainly help to keep the line open. Now there comes a point that if the number of airplanes that are being purchased falls to too low a level, then the cost gets too high and that further discourages foreign military sales. So there is a balance there. We are working very closely with General Dynamics and with our international sales people to try to get a handle on that.

Senator LEVIN. What is the minimum?

General RALSTON. One shift of operations, according to the best information I have—and this is still under negotiation—is something around seven to eight airplanes per month. That gives you one shift of operation.

Senator LEVIN. So you are talking 80 a year maybe?

General RALSTON. Talking about 80-some airplanes a year gives you a good one-shift operation. Now it may be possible that we can do it at something less than that, and that is what we are working with the contractor now.

Senator LEVIN. Thank you all. We appreciate your coming by.

[Whereupon, at 5:01 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

TUESDAY, MAY 7, 1991

U.S. SENATE,
SUBCOMMITTEE ON CONVENTIONAL FORCES
AND ALLIANCE DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NAVY ACQUISITION PLANS AND MODERNIZATION REQUIREMENTS

The subcommittee met, pursuant to notice, at 3:13 p.m., in room SR-222, Russell Senate Office Building, Senator Carl Levin (chairman of the subcommittee) presiding.

Committee members present: Senators Levin, Dixon, Glenn, Cohen, McCain, and Wallop.

Committee staff members present: Daniel G. Sakura, research assistant.

Professional staff members present: John J. Hamre and Michael J. McCord.

Minority staff members present: Patrick A. Tucker, minority staff director and counsel; Romie L. Brownlee, deputy staff director for the minority; George W. Lauffer, John E. Mansfield, Durwood W. Ringo, Jr., and Mark B. Robinson, professional staff members.

Staff assistants present: Barbara Gallo, Elizabeth Ann Harlow, Lisa H. Kettlewell, Cindy Pearson, and Mickie Jan Wise.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Phillip P. Upschulte, assistant to Senator Glenn; James M. Bodner, assistant to Senator Cohen; Anthony H. Cordesman, assistant to Senator McCain; Thomas G. Moore, assistant to Senator Wallop; Samuel D. Adcock, assistant to Senator Lott; and Thomas L. Lankford, assistant to Senator Smith.

OPENING STATEMENT OF SENATOR CARL LEVIN, CHAIRMAN

Senator LEVIN. Good afternoon, everybody. This afternoon the subcommittee holds its second hearing on the fiscal years 1992–1993 budget request. Our hearing today focuses on the Navy's acquisition plans and modernization requirements for carrier-based Navy aviation.

The Navy's acquisition plans for carrier-based aviation have been radically altered during the past 8 months. Last year the Navy pro-

posed to remanufacture 75 F-14s over the next 6 years. This year the program is terminated.

Last year the Navy was promoting the A-12 as the highest priority system, and it was "on schedule and on cost," and 8 months later the program was terminated by the Secretary of Defense because of cost overruns and schedule delays.

Last year the Navy planned to gradually reduce the production rate on the F-18 to minimum sustaining rates to manufacture only enough aircraft to replace aircraft lost to accidents. This year the Navy is proposing a $4 billion upgrade for the F-18 that would make the F-18 one of the two long-term modernization programs for Navy aviation.

Without being unnecessarily critical, I think it is fair to say that Navy aviation is in a state of flux, if not chaos. While all of the services have had to make difficult decisions in adjusting to lower budget levels, no other area of national defense has undergone such fundamental changes as have occurred in Navy aviation. Today we will try to uncover the underlying assumptions that have led the Navy to make the choices that have now been made.

This subcommittee has worked hard during the past 4 years to try to rebuild Navy aviation. We look forward to working with the Navy and with our witnesses today to promote a stable, affordable, long-term naval aviation modernization plan.

We have two distinguished witnesses with us this afternoon: Mr. Gerald A. Cann, Assistant Secretary of the Navy for Research, Development, and Acquisition; and Vice Adm. Richard Dunleavy, Assistant Chief of Staff for Naval Operations for Air Warfare. Mr. Cann is the Service Acquisition Executive for the Department of the Navy, and Admiral Dunleavy is the senior flag officer for Navy aviation and as such is the man who determines what the Navy needs to ensure that Navy aviation can meet future demands.

Because there have been such fundamental changes in Navy aviation programs this year, I think it is critical that we focus this year on requirements so that we can understand the Navy's acquisition objectives from that context.

I understand, Admiral, that you have a son serving in the Persian Gulf.

Admiral DUNLEAVY. He got home last Sunday. Thank you very much.

Senator LEVIN. Well, we congratulate you on that. We understand he is in the Air Force, and that he is a body guard, or one of them, for General Schwarzkopf.

Admiral DUNLEAVY. That is correct, sir.

Senator LEVIN. All of which really proves that the Goldwater-Nichols plan is working. [Laughter.]

Admiral DUNLEAVY. That was his mother's doing.

Senator LEVIN. You have an Admiral's son in the Air Force guarding an Army general. That is unity at its best. [Laughter.]

Before I call on Senator Cohen for his opening statement, I would say that Senator Shelby may not be able to join us today. His mother passed away last weekend, so he may or may not be able to join us. His mother was 93. She was of good age, but nonetheless, we hope he can be with us today. Senator Cohen.

Senator COHEN. Just a quick comment, Mr. Chairman, to welcome our two witnesses today.

The Navy may be in a state of flux or, as you described it, chaos, but I think that we have to also examine whether or not Congress may have played a role—and I am not sure this is the case—but whether we have imposed so many burdens upon the aircraft of the future, that the aircraft was simply unable to fly at that price or with that weight or with that mission.

And so, as we look to see what went wrong with the A–12 and try to look forward into the future to develop a modern, high-tech as such stealth aircraft for the Navy, I think what we have to do is try and decide upon what kind of modernization plan we can afford to adopt in the interim, what kind of upgrades can we make that will not forfeit the funds that are going to be necessary to develop the long range aircraft, whether we are going to have rewinging of the A–6 in its upgrade or the F/A–18 modernized or the F–14A retrofitted, and other decisions that will have to be made for the interim.

I think this is going to be an important hearing and will contribute to our understanding as to what we can afford to do in the short term in order to preserve not only our security, but also to preserve those funds that are going to be necessary to develop the future ATF or the Navy's ATF. Thank you very much.

Senator LEVIN. Thank you, Senator Cohen. Senator Glenn, do you have an opening statement?

Senator GLENN. Not at this point. No, I do not have any opening statement. I am very interested in the subject, though. Thank you.

Senator LEVIN. Secretary Cann.

Mr. CANN. Good afternoon, Mr. Chairman and distinguished members of the subcommittee. This afternoon, as you have indicated, I have brought Vice Adm. Richard Dunleavy, Assistant Chief of Naval Operations for Air Warfare, with me. I think it would be appropriate, before I get into the comments I have, for him to lay out for you the naval aviation requirements issues, and following his statement, I will have comments of my own prior to taking your questions. With that, I turn this over to Admiral Dunleavy.

Senator LEVIN. Thank you. Admiral.

STATEMENT OF VICE ADM. RICHARD M. DUNLEAVY, U.S. NAVY, ASSISTANT CHIEF OF STAFF FOR NAVAL OPERATIONS (AIR WARFARE)

Admiral DUNLEAVY. Good afternoon, Mr. Chairman and distinguished members of the subcommittee. Thank you for inviting us today to testify on the naval aviation's modernization requirements and acquisition plans. With your permission, Mr. Chairman, I have a posture statement that I would like to submit for the record at this time.

Senator LEVIN. It will be made part of the record.

Admiral DUNLEAVY. Before we address the future of naval aviation in today's testimony, I would like to provide a brief perspective of the modernization plan for naval aviation and some background that will hopefully clarify how we arrived at these objectives.

The United States has, over the last decade, made a major investment in its military posture, not the least its Navy. That investment has paid invaluable dividends, most recently in our highly successful liberation of Kuwait. However, during this past year, we have witnessed other dramatic changes in the world order that are having a major impact on our naval force structure and naval aviation. The challenge before us now is to preserve our defense investment at a time of great global uncertainty and a declining budget, and to do so in a way that makes both fiscal and military sense.

The fiscal year 1992 budget represents a significant reduction in naval aviation force structure and a major loss of programmed replacement aircraft. Aircraft carriers will be reduced from 15 to 12. Carrier airwings will be reduced from 13 Active and 2 Reserve to 11 Active and 2 Reserve by the end of 1993. The MPA squadrons, maritime patrol aircraft squadrons, will be reduced from 24 Active and 13 Reserve squadrons to 18 Active and 9 Reserve squadrons. In addition, the A-12, the P-7, the advanced tactical surveillance aircraft, the Navy ATF, and the F-14D programs have all been canceled. Naval aviation is clearly confronted with a modernization crisis. We have had to completely revise our modernization plans.

The new plan is reflected in the amended budget submission you have recently received. In essence, it was decided that we should transition our current carrier airwing fighter/attack aircraft mix of 20 F-14s, 20 F/A-18s, and 16 A-6s to an airwing of 40 stretched F/A-18s and 20 A-X aircraft. We feel this airwing is an achievable objective within projected fiscal constraints, will meet its wartime requirements, and should retain our technological edge.

Mr. Chairman, the carrier airwing is a primary force of naval power projection. Its composition has been the focus of considerable study and intense debate during recent months. I feel it is important that I share with you the logic that has guided us to our new airwing force structure.

As we planned for the future, it became clear that our national security strategy would likely shift from containing the Soviet Union to maintaining regional stability. This evolving strategy will continue to place high demands on our carrier battle groups in a turbulent, multi-polar world.

Naval aviation is faced with a declining budget and massive aircraft retirements as we approach the year 2000. It is vital that we buy enough aircraft to fill our carrier decks. Yet, our old modernization plan is clearly unaffordable. We are faced with the choice of lowering the cost of our airwing or cutting more force structure below 12 carriers. We have had to make some painful decisions.

Our highest priority is the procurement of a survivable, all-weather, long-range attack aircraft to replace the aging A-6. Third-world air-to-air and surface-to-air threats are becoming increasingly sophisticated and lethal. Modifications to current generation aircraft are not acceptable solutions. We need the survivability and the all-weather, deep interdiction capability of the A-X aircraft. Our most cost effective interim fix is to improve the A-6 with new wings and modest upgrades until the A-X IOCs in the 2003-2005 timeframe.

The Navy ATF is unaffordable at forecasted budget levels. Our next challenge is to decide how to modernize the F-14 and the F/A-18. Separate upgrades or replacements for both of these aircraft are cost prohibitive. It would have required additional force structure cuts.

The Soviet anti-carrier strike is the most challenging air-to-air threat to the aircraft carrier. It is not likely we will face this scenario in the foreseeable future. The stretched F/A-18E/F has about the same range as the F-14D, and with the AAAM it can meet the warfighting requirements for anti-air warfare with acceptable risk. The F/A-18 is a more effective strike aircraft than the F-14 in that it is more accurate, has more advanced weapons systems features, has a night attack capability, has greater range of the weapons it carries, and has less vulnerable area. In addition, the F/A-18 can generate more sorties, is safer, requires fewer personnel, and is cheaper to operate.

Replacing both the F-14 and the F/A-18 with the F/A-18E/F offers major cost savings. The F/A-18E/F is cheaper than the F-14D on an aircraft-to-aircraft basis. This neckdown requires less total R&D than pursing both upgrades. It yields one efficient production line vice two inefficient lines. It lowers support and infrastructure costs. It lowers operating costs and personnel costs.

Necking down to the F/A-18E/F is the most logical and cost effective solution to satisfy the F-14 and F/A-18 mission requirements. So, we chose that course and decided to build toward a 2010 notional airwing of 40 F/A-18E/Fs and 20 A-X aircraft. As we transition to this new airwing, we will be forced to accept a temporary drawdown in medium attack aircraft until the A-X arrives. For this reason, it is important that we increase the F/A-18 procurement now to keep our carrier decks full in the out-years.

Mr. Chairman, our plan to modernize the carrier airwing will allow the Navy to achieve a balanced naval aviation force structure, meet warfighting requirements, and maintain 12 carrier battle groups. The continued support of Congress in protecting our investment in naval aviation will ensure our success as we bring this plan to fruition.

Mr. Chairman, I would like to turn over the microphone to Mr. Cann at this time.

[The prepared statement of Admiral Dunleavy follows:]

PREPARED STATEMENT BY VICE ADM. RICHARD M. DUNLEAVY, U.S. NAVY, ASSISTANT CHIEF OF STAFF FOR NAVAL OPERATIONS (AIR WARFARE)

NAVAL AVIATION MODERNIZATION REQUIREMENTS AND ACQUISITION PLANS

INTRODUCTION

Mr. Chairman and distinguished members of the subcommittee, I appreciate your invitation to present the Department of the Navy's plan for force structure and modernization in fiscal years 1992 and 1993 and to update you on other significant developments which influence Naval aviation's contribution to the military strategy of the United States.

BUDGET OVERVIEW

During this past year, we have witnessed dramatic changes in the world order that are having a major impact on our Naval force structure and Naval aviation in particular. The destruction of the Berlin Wall, disintegration of the Warsaw Pact

military alliance, and an uncertain Soviet military posture have allowed us to refocus our national attention on domestic issues, the budget deficit, and reduced defense spending. In the President's budget, this is reflected in a significant reduction of Naval aviation force structure and aircraft procurement. Recent program setbacks, coupled with affordability cancellations and delays of major weapons systems like the A-12, NATF, ATS, F-14D remanufacture, P-7A, and Update IV have even further complicated our force planning and modernization goals. Now, our future is even less certain, given the Persian Gulf war and continuing confusion in the Soviet Union.

In short, Naval aviation is confronted with a complex dilemma. On one hand, we are attempting to reduce force structure while simultaneously modernizing within the tight fiscal constraints of a declining budget and, on the other hand, we are supporting the cost of Operation Desert Storm. We clearly face a difficult challenge.

The initial Aircraft Procurement, Navy (APN) request for fiscal year 1991 was $9,838 million to procure 178 aircraft. The Navy, DOD, and congressional budget review process, coupled with the cancellation of the P-7 and A-12 programs for contractor default, and the EA-6B program restructure have severely impacted Naval aviation. This process reduced the fiscal year 1991 APN budget request by $2,095 million to $7,743 million and procurement of 115 aircraft. The net result is a 27 percent reduction in APN funding for fiscal year 1991. The fiscal year 1992 APN request is $7,231 million for procurement of 119 aircraft and the fiscal year 1993 APN request is $6,953 million for procurement of 104 aircraft. In the fiscal years 1992-1993 budget request, approximately $4,200 million per year in APN 1-4 will be applied to actual aircraft procurement, while the remaining funds will cover modifications, spares, repairs, and support equipment.

FUTURE OF NAVAL AVIATION

The magnitude of the budget reductions and programmatic cancellations cited for Naval aviation represents a significant reduction in force structure and a major loss of programmed replacement aircraft. Fourteen carrier battle groups are no longer affordable; we have had to reluctantly accept a reduction to 13 total aircraft carriers with resultant deployment and warfighting restrictions. In keeping with this decision, we are planning to reduce carrier airwing (CVW) force levels to 11 active and two reserve airwings by the end of fiscal year 1993. Since cancellation of the A-12 program, the composition of our carrier airwings has become the focus of considerable study and intense debate. Affordability, power projection, preservation of required mission capability, and survivability surfaced as primary concerns. Following extensive deliberation, it was decided that the airwing of the future should basically be a *Theodore Roosevelt* (TR) airwing containing 40 strike fighters and 20 all-weather long-range attack aircraft. A transition from the F-14 and the F/A-18C/D to a new and more capable F/A-18E/F aircraft is part of this strategy. The second part is the rewinging of 120 A-6E aircraft to bridge the gap until a new all-weather long-range strike aircraft, the AX, is developed. The inventory shortages of other airwing aircraft, like the S-3B, E-2C, and EA-6B, have been ameliorated by force structure reductions and will continue to be incrementally updated as funding permits.

Given the austerity of the projected fiscal climate, this airwing represents our best choice. It sustains a highly effective power projection capability, and I view it as our best option for building the Naval aviation force of the next century.

THE IRAQ WAR

On August 2, 1990, the military forces of Iraq invaded the sovereign State of Kuwait. This act of aggression was deplored by the United States and a coalition of the United Nations. Fearing the threat of continued Iraqi aggression on Saudi Arabia, President Bush ordered our military forces to station in defense of Saudi Arabia. Within 5 days of the Kuwait invasion, two U.S. carrier battle groups arrived on station within striking range of Iraq, ready to respond. Fifteen days later, two additional carrier battle groups arrived on station. After economic sanctions and negotiations failed to free Kuwait, the United States and a coalition of United Nations entered a state of war with Iraq on January 16, 1991. At that time, the Navy had six carrier battle groups and a Marine Air Ground Task Force (MAGTF) on station in support of the war effort. This course of events clearly highlighted the utility, responsiveness, and necessity of top-notch carrier aviation and Marine amphibious forces during an international crisis. Our strategy of immediate response with Navy power projection forces proved successful in deterring further Iraqi aggression and permitting an air/land force buildup in Saudi Arabia.

National concern for power projection often loses its support and budget priority during extended periods of world peace. Fortunately, during the 1980s, we had the foresight and national resolve to significantly upgrade and invest in our defense posture. We are now reaping the benefits of this investment with a Naval aviation force that is second to none. Our readiness, confidence, and morale are high. We were ready to fight and win. Naval aviation shared the success of air supremacy over Iraq. Our losses were minimal, and we were confident in victory over Saddam Hussein. However, it was emphatically clear that victory would not come easily, and it would require the joint effort of all of our military resources. This raises an issue that deserves serious consideration as we address the defense budget for the outyears. Even though we optimize our defense posture with the funds appropriated, budget reductions inevitably make us a less capable force. This leads to the question: How much of a less capable force can we accept and still be in a position to face our next Saddam Hussein? It's a question of risk, and hopefully we have made the right decisions. One fact is for certain—we succeeded in a war with Iraq and this should provide us with a measure of the accuracy in our past projections and decisions. We must continue to learn from this experience and make the appropriate budget adjustments.

NAVAL AVIATION AND NATIONAL DEFENSE

As the leader of the free world and a maritime nation, the United States remains deeply committed to sea power for economic vitality and political stability. Globally, Naval forces are a most visible reminder to our allies, friends, and adversaries of the United States' resolve to defend its national interests and to provide the stability under which free world political and economic activity can flourish. The mobile and flexible forces of the Navy and Marine Corps contribute to global stability through their ability to confront potential aggressors and troublemakers with a broad range of military options—broad in geographic impact and capable of rapid response and measured intensity. Our carrier battle groups are capable of providing the right amount of force at the proper time because the carrier brings tactical air power to the scene. It is the embarked airwing, a self-contained package of all required aircraft types, easily tailored to suit the particular situation, that makes the carrier especially valuable to decision makers. It provides us with a credible, well-trained, and ready force with which to influence events, a force which can be sustained indefinitely on station. Whatever the nature of our changing security environment, national decision makers will continue to rely heavily on carrier battle groups in response to a crisis.

Our Nation's access to foreign bases and overflight rights is not always guaranteed. We may increasingly rely upon the mobility and versatility of carrier battle groups and marine amphibious forces to fill this vacuum when confronting aggression and providing for regional stability. Our combat experience in the war with Iraq has clearly validated the strategic advantage of these mobile strike forces.

Our carrier battle groups are operating daily in peacetime as they would in combat-*forward*, with our allies and sister services, where real adversaries must be confronted. They operate throughout the world, with allied forces maintaining necessary levels of readiness and training, not only to deter war but to fight and win should deterrence and diplomacy fail. Naval aviation exercises in the environment and geographical areas in which confrontation would likely occur. Because of their proximity and inherent capabilities, the response is swift and effective. Carrier battle groups, with their long range, state of the art, air arms can deploy for as long as necessary and fight at whatever level of conflict the situation demands. Naval forces can affect world events quickly and decisively, and once political or military objectives are achieved, rapidly de-escalate and withdraw from the operating area.

Carrier-based aircraft, in conjunction with shore-based maritime patrol aircraft, provide a critical dimension to sea power. Sea power is effective because it has mobility, flexibility, global reach, and is self supporting. Air power adds speed, altitude, and reach in a four-dimensional (surface, subsurface, land, air) warfighting environment. Carrier aviation is always ready to conduct offensive operations against targets ashore, afloat, or under the sea with the great advantage of rapid revisit capability. The ability of carrier-based aviation to employ the vast array of sensors and weapons required for successful antisubmarine and electronic warfare makes for an unmatched force multiplier. This concentrated offensive air power is an effective and highly visible deterrent, which operates freely, independent of foreign shore bases, political constraints, and the sovereign claims of other nations.

Cruise missiles, unmanned air vehicles, and other systems operate as complements to our air power at sea, but none will take the place of aircraft, where precision, heavy ordnance, and man-in-the-loop targeting are critical. When it becomes

necessary to dominate and maintain air superiority over a battle space, when it becomes necessary to deliver heavy volumes of ordnance on a repetitive basis, when a quick decisive strike is called for, or when it becomes necessary to combat high speed and versatile multi-threat forces, there is, and will be, no substitute for air power at sea. Our combat experience in Iraq clearly substantiated this.

For the present, our technological edge, superior training, tactical initiatives, and innovations, combined with the exceptional quality of our people, have given us the advantage in combat. We were confident in victory as we engaged in war. However, Naval aviation must continue to modernize in order to maintain this advantage. Our future adversaries are also benefiting from new technology and acquiring better weapons in every category.

This budget supports 13 total aircraft carriers. Recently approved adjustments in CVBG forward deployments are consistent with this reduced carrier force. The Navy will take appropriate actions to avoid increased operational and personnel tempo, which have historically had an adverse impact on personnel retention and has degraded the material condition of ships and aircraft. This happened to us during the late 1970s. Relearning the hard lessons of those budget decisions is not in our best national interest.

NAVAL AVIATION PRIORITIES/ISSUES

The fiscal years 1992-1993 budget request represents a significant reduction in Naval aviation budget authority, which in turn translates to a reduction in force structure, aircraft procurement, and modernization. As we streamline and restructure to provide required capabilities and support the new U.S. defense strategy, our top priorities remain unchanged. They are our people, readiness, safety, and modernization to maintain a balanced force structure.

People Programs. The heart and soul of our present and future capability is our people. Maintaining adequate levels of highly-motivated and well-trained people to man Naval aviation is my highest priority. The American sailor and junior officers are the ultimate force multiplier over any potential adversary. To wage modern warfare in this age of sophisticated weapons, it is imperative that we preserve our flying hour program, quality training, and technical education programs to meet our commitments and retain our best people.

The fiscal years 1992-1993 budget request reflects an overall aviation manpower reduction, primarily related to force structure cuts. Ship and squadron manpower will be reduced to 87 percent of wartime (M + 1) requirements, with commensurate reductions in shore training and support infrastructure. Correction of the imbalance between sea duty and shore duty assignments continues to be held in abeyance for affordability reasons. If further manpower reductions are mandated, our ability to bring new weapon systems on line safely, efficiently, and effectively and maintain our perstempo goals, will be constrained.

In an environment where manpower is stretched thin, retention has historically suffered. Retention of experienced officers and petty officers is fundamental to readiness, economy, and safety. Experienced personnel maintain and operate complex weapons systems more effectively, resulting in improved readiness and safety. Retention reduces training costs. In the case of pilots, these costs are dramatic; it costs up to $1.25 million to train a fleet-ready carrier aviator.

Our recent experience indicates the Aviation Continuation Pay (ACP) Program, complemented by the increase in Aviation Career Incentive Pay (ACIP), is proving successful; however, pilot retention, although improved, remains slightly below requirements. High-tech industry continues to attract our well-trained officers and petty officers. It is absolutely necessary that military salaries and benefits keep pace. If additional career incentives are required, we will request them.

Readiness. Operating an effective Naval power projection force on a day-to-day basis is the goal of readiness. Readiness must be maintained for maximum sustained warfighting capability. Naval aviation, the essential component of American sea power, must remain capable to execute its national defense responsibilities which could range from a presence in response to terrorism, to all-out war. Naval readiness is America's insurance for crises. Today, our forces on station are ready. Our daily success in combat was attributed in large measure to the high level of peacetime readiness we sustain.

To ensure our crews remain ready, the President's budget will keep flying hours at the levels required for safety and readiness. It will provide required training for aircrews at rates needed to maintain squadron readiness. It will provide for shore-based support infrastructure which protects the material readiness of carriers and aircraft while emphasizing safety, reliability, and maintainability in operations.

Balanced Forces. We must continue to provide a balanced Naval aviation force structure which is optimized and modernized across all mission areas. The planned force structure of 13 aircraft carriers, 11 active and 2 reserve carrier airwings, 3 active and 1 reserve Marine Corps airwings, and the requisite number of maritime patrol squadrons and ASW helicopters will provide the warfighting capability necessary to execute the CINCs' war plans.

Modernization. Naval aviation's modernization plan encountered major setbacks during fiscal year 1991 as a result of cancellation and delay of weapons systems like the A-12, F-14D remanufacture, NATF, ATS, P-7A, and Update IV programs. In terms of loss in Total Obligation Authority (TOA), the impact was severe. Our new modernization plan is evolutionary (F/A-18E/F, EA-6B ADVCAP, S-3B, E-2C, AV-8B Night Attack) and revolutionary (AX, MLR), applying the latest technology to achieve superiority and survivability against sophisticated threats. We will capitalize on what Naval aviation does best while integrating the strengths of sister services and allies. We will increasingly develop standoff weapons and electronic warfare systems as force multipliers. Through commonality and modular design, Naval aviation will continue to consolidate the number of different aircraft and weapon types to save manpower and support costs.

Safety. Naval aviation has just completed its third safest year in history. The 1990 USN/USMC mishap rate was 2.96 mishaps per 100,000 flight hours with 63 Class A mishaps. This compares to 1988's record low rate of 2.16 and 46 mishaps. Aviation fatalities were reduced from 78 in 1989 to 42—the lowest ever. The USN mishap rate is projected to be 1.98, derived from just 34 mishaps; also, the lowest ever. Continued command leadership and proactive awareness at the operator level were proven methods toward ensuring safe and successful conduct of operations in our inherently hazardous profession. Our success is due to the cumulative effects of adequate flight hours, improved aircrew training methodologies, new technologies, and spare parts funding in past years. However, we are not content to rest on our low mishap rate. As good as it was in 1990, we still had 63 mishaps too many.

FORCE STRUCTURE AND MODERNIZATION

In this changing world, it is essential to maintain our warfighting edge and gain maximum benefit from each budget dollar; therefore, improvements and added capability are limited to only those necessary to improve safety, meet operational requirements, extend service life, enhance survivability, and improve maintainability to reduce costs and lower manpower requirements. Maximum competition, block upgrades, optimum use of acquisition streamlining, maximum standardization and commonality, remanufacturing in lieu of procurement, and Weapon System Improvement Programs (WSIPs) are all being used to ensure the wise allocation of our limited resources. Whenever possible, we will participate in joint-service development programs like the AMRAAM and AIM-9R missile programs to conserve funds. Our maritime superiority is vitally dependent on the technological edge we achieve through intelligent investment and modernization.

Aircraft Carriers. The decision to reduce the total number of aircraft carriers from 16 to 13 was based on affordability and considered an acceptable risk to support projected peacetime deployment commitments. The long-range management plan encompasses new construction, complex overhauls (COH), and nuclear refueling.

U.S.S. *Coral Sea* was decommissioned on April 30, 1990 as scheduled. Her replacement, U.S.S. *Abraham Lincoln*, has completed shakedown operations and is ready for fleet operations.

U.S.S. *Midway* has returned to Japan from Desert Storm. She is scheduled to be relieved this summer by U.S.S. *Independence* and will be retired and placed in the mobilization fleet.

U.S.S. *Kitty Hawk* is completing her SLEP now and U.S.S. *Constellation* is about 8 months into her SLEP. U.S.S. *Constellation* will close out the Navy's SLEP program for conventionally-powered aircraft carriers.

U.S.S. *Lexington* will be retired this year and U.S.S. *Forrestal* will become the training carrier homeported in Pensacola, Florida. U.S.S. *Forrestal* will be maintained so we can reactivate her as a front-line carrier in 6 to 9 months. U.S.S. *Ranger* will be retired in fiscal year 1993 and placed in the mobilization fleet. This plan will permit a buildup to 14 carriers in the event of crisis.

The nuclear refueling and overhaul of U.S.S. *Enterprise* commenced on schedule. This 4-year effort will provide a front-line nuclear aircraft carrier (CVN) for an additional 20 years.

Carrier Airwings. Power projection is one of the Navy's top warfighting priorities. The carrier battle group is and will remain the primary force for power projection

for the foreseeable future. The core of this force is the strike capability of the carrier airwing. Maintaining the airwing's technological edge is of paramount concern. With some components of the airwing now reaching 30 years of age, aircraft replacement must become a top procurement and modernization priority. To achieve modernization and meet budget constraints, a force structure reduction was necessary. The Navy's new requirement to support 13 total aircraft carriers is 11 active and 2 reserve airwings. Procuring adequate numbers of modern aircraft will continue to be a challenge.

Strike Aircraft. Our ability to project power ashore is central to the airwing's warfighting capabilities. With the cancellation of the A-12, aviation planning efforts will continue to focus on the development of a long-range, survivable, all-weather replacement for the aging A-6E. After careful analysis, we have concluded that current generation aircraft, even with extensive upgrades, will be inadequate for the medium attack mission of the next century. A follow-on program to replace the A-6 is being initiated and designated the "AX." A thorough review and revalidation of the medium-attack operational requirement is currently in progress. This aircraft will incorporate the latest technologies proven successful in combat and provide a quantum improvement in survivability and operational effectiveness.

Until an acceptable replacement aircraft is introduced, the A-6E Intruder will continue in service as our only all-weather, long-range attack aircraft. To ensure a viable power projection capability, we are currently modifying the A-6E aircraft with new composite wings, the Weapon/System Integration Program (SWIP), and the Block I/II Upgrade Programs. These modest upgrades will improve survivability and standoff range with HARM, HARPOON, Infrared/Laser Maverick, Skipper, and SLAM weapons systems. A Block IA Upgrade will be incorporated in 221 SWIP aircraft to improve survivability and reliability with a new computer, Inertial Navigation System (INS), Heads Up Display (HUD), and Integrated Defensive Avionics Program (IDAP). These measures should allow us to bridge the development gap in medium attack.

The F/A-18 Hornet strike fighter continues to prove itself as a versatile, reliable, and highly effective war plane. A series of pre-planned product improvements has systematically expanded the Hornet's warfighting capabilities. They include: a night attack capability, multi-sensor integration, a radar upgrade, and additional weapons capabilities. A force multiplier capable of close-air support, air superiority, fighter escort and interdiction, this aircraft offers superb multi-mission capability and excellent growth potential. As we modernize the F/A-18, we add weight to the aircraft, which eventually will require a structural upgrade. The fiscal years 1992-1993 budget includes funding for development of the next generation F/A-18, which is primarily a structural upgrade. The F/A-18E and F versions will significantly upgrade current F/A-18 capabilities in range, payload, and performance.

The AV-8B Harrier program has been restructured over the past years to represent a solid balance between fiscal resources and requirements. Operational experience with the AV-8B has shown the airframe to be reliable, maintainable, and capable of substantial growth. Night attack capability, an upgraded engine, and a radar, which is being pursued in a cooperative program with Spain and Italy, will allow the AV-8B to more effectively accomplish its missions over a broad spectrum of operational and combat scenarios.

Amphibious Warfare and Combat Support Aircraft. The requirements to replace the aging CH-46E helicopters in the Marine Corps and to improve Strike Rescue and Vertical Replenishment (VERTREP) in the Navy remain a high priority. The V-22 program was initiated to fill these warfighting requirements and allow Marine Corps CH-46s to meet Navy VERTREP shortfalls.

Cancellation of the V-22 Osprey in April 1989 required the Department of the Navy to evaluate alternatives not only in amphibious assault, but also in Strike Rescue and VERTREP. In response to congressional direction, the Institute for Defense Analysis (IDA) conducted a Cost and Operational Effectiveness Analysis (COEA) to provide the analytical data to assist in definition of alternatives to the V-22. Based upon the results of the COEA, Congress funded continued Full Scale Development (FSD) and long lead production of the V-22 in the fiscal year 1991 budget. We are continuing development, but the procurement funds have been placed on hold by OSD. Our fiscal year 1992 budget request includes $51 million to begin development of a Medium Lift Replacement (MLR) aircraft. It is imperative that we move ahead with a program to replace the aging CH-46s. Continued delays will further jeopardize our ability to satisfy this critical warfighting requirement.

Antisubmarine Warfare (ASW). Although ASW no longer ranks as the Navy's number one warfighting priority, it is still one of our top operational requirements. The Soviets continue to produce new construction submarines at a rate far greater

than the United States, and there has been a significant proliferation of very capable submarines to Third World nations. Naval aviation remains a key element in ASW. Inherent in aviation is its ability to respond rapidly, quickly relocate, cover a large search area, and rapidly replenish its weapons. The mainstays of our arsenal are the P-3C, S-3B, SH-60B/F, and the SH-2F/G. While the primary mission of these aircraft is ASW, it should be noted that they also play important roles in many other mission areas, such as antisurface warfare, mine warfare, in-flight refueling, search, and surveillance.

We continue with the modernization of the fleet's Maritime Patrol Aircraft (MPA). By mid-1993, the remaining active P-3C squadrons that require update will have been retrofitted with the Update III package, enabling these aircraft to keep pace with the emerging threat. The Update IV package, which provides a significantly expanded ASW and over-the-horizon capability, is in Full Scale Engineering Development. The Update IV avionics suite is planned for retrofit into Update I and II aircraft and is the planned avionics suite for the follow-on aircraft to the P-3C. Funding for procurement of the Update IV system will be addressed in the fiscal year 1994 budget request. Reserve P-3Bs are being replaced by updated P-3Cs. Although we found it necessary to terminate the P-7 contract in July 1990, the requirement for a P-3 follow-on aircraft remains valid. The P-3C approaches the end of its service life before the end of this century. We are currently exploring various alternatives that will satisfy the MPA requirement.

The S-3B Weapons System Improvement Program (WSIP) continues to perform extremely well in every area. The multi-mission aspects of this platform (ASW, EW, ASUW, and IFR) make it the workhorse of the fleet. WSIP deliveries should be complete in 1994.

The Navy continues to procure SH-60Bs to fill inventory requirements for LAMPS MARK III ships. The program is on track and performing extremely well. The SH-2F will continue to be modernized to the SH-2G configuration to enhance its effectiveness in both the active and Naval reserve forces.

Delivery to the fleet of the SH-60F CV ASW helo commenced in January 1990. It is replacing the 30-plus-year-old SH-3 as the CVBG's primary inner zone ASW asset. Improved aircraft and sensor performance greatly increases its search area. The Airborne Low Frequency Sonar (ALFS) is scheduled for introduction in the SH-60F in 1997 and the SH-60B in 1998. This sensor will expand SH-60F search coverage by approximately 500 percent.

The Navy is also procuring HH-60Hs for integration into the CVs HS squadron. Two additional aircraft will provide organic, real-time Strike Rescue/Special Warfare Support for the CVBG.

Air Superiority. The Navy must have the capability to establish air superiority. Naval aviation is working in conjunction with other warfare sponsors to implement an Anti-Air Warfare (AAW) Master Plan that provides a fleet-wide assessment of force AAW capabilities vis-a-vis requirements into the early 21st century. The purpose is to identify methods of making existing systems work best in coordinated operations and to outline RDT&E and procurement priorities for the next several years. In view of the Soviet's Naval aviation developments at sea and proliferation of sophisticated technology to Third World countries, the AAW Master Plan provides a roadmap to meet those emerging threats.

Our procurement strategy is defined by a balance between affordability and mission requirements in order to meet Secretary of Defense stated objectives of streamlining and restructuring the Navy within projected fiscal constraints. The 1990s will be a decade of development. The fiscal years 1992-1993 budget submission terminates a number of programs including the F-14D remanufacture and Naval Advanced Tactical Fighter though we will continue to provide development funding for elements of the Pre-Deployment Update (PDU) for the F-14D.

The F/A-18 continues to fulfill its multi-mission requirements superbly, including attack, fighter escort, and short to mid-range intercept, as F-14 augmentation in the outer air battle. The capability to perform both strike and fighter missions allows the carrier battle group commander unparalleled flexibility in configuring the Hornet as battle situations change. The digital weapon system of the F/A-18C yields greater combat effectiveness by including the capability for AMRAAM and ASPJ. Development funding requested for the radar upgrade is absolutely essential.

The E-2C continues to be the centerpiece of both our carrier battle group command and control requirements and the Navy's counter-narcotics detection and monitoring operations. The E-2C weapons system update program continues to be highly successful. Our request for six E-2Cs in fiscal year 1992 and six in fiscal year 1993 will continue to satisfy fleet inventory requirements. Wing crack repair programs are on schedule, with only 11 aircraft, compared to 18 last year, grounded for

wing cracks. All are now in the repair pipeline. Full modification funding (APN-5), as requested, will maintain the Navy's plan on track and allow us to begin the retrofit program to an all-group II E-2C force.

Electronic Warfare. The Desert Storm scenario showed us that sophisticated electronic technology has spread into the Third World. While not present in the numbers that we would expect to see in the Soviet Union, the concentration of threat systems in many high value target areas was as great as that found anywhere in the world. The threat to our aircraft in most Third World scenarios is at least as great as it was when the Soviets were the primary threat. Today, we have to deal with sophisticated Free World systems as well as Soviet systems. We must continue to develop and deploy the self-protection systems that will make our aircraft survivable. The EA-6B remains the primary platform for suppression and degradation of enemy defense systems by tactical jamming and counter-target jamming support for battle groups and Marine Corps forces. The impressively low combat attrition experienced by allied tactical aircraft during operation Desert Storm was in no small part due to the effectiveness of the EA-6B. EA-6B procurement was terminated in fiscal year 1990 for affordability reasons. This will necessitate careful management of our assets until a replacement aircraft is developed and deployed. Starting this year, the EA-6B is being remanufactured into the Advanced Capability (ADVCAP) configuration, which will meet the requirement to counter today's threat and retain its effectiveness as the threat continues to evolve.

The first fully configured ES-3A aircraft is scheduled to begin contractor ground and flight testing in March 1991 with Navy test and evaluation following in late summer. Personnel for the first squadron have begun reporting to NAS Agana, Guam, and those going to the second squadron at NAS Cecil Field are reporting to initial training squadrons at this time.

Advanced Tactical Surveillance (ATS). ATS was to perform the battle management, surveillance, and multi-dimensional warfare missions currently accomplished by the E-2C, S-3B, and EA-6B aircraft. However, the costs associated with the development of a multi-mission ATS are unaffordable at this time. We will have to make our existing aircraft systems last longer than we had planned.

Training. As we field more sophisticated weapon systems, we continue to stress that associated training systems be funded in parallel and that they exploit technological initiatives within fiscal parameters. Recently, advancements in simulation have allowed us to introduce the capability of providing deployed aircrews with weapon systems training and visual mission rehearsal. Technology in simulation is also expanding the capabilities of our instrumented training ranges.

Aircrew proficiency and tactics development are best accomplished on instrumented training ranges. The Tactical Aircrew Combat Training System (TACTS) utilizes computer simulation to provide aircrew training in weapons and countermeasures employment along with tactics development. Our range of the future, Tactical Combat Training System (TCTS), will go beyond TACTS by providing the capability of conducting integrated battle group/force multi-warfare training. TCTS instrumentation will be designed to provide accurate, realistic, and timely feedback of exercise activities without artificially constraining the exercise participants.

In addition to employing the latest technology, robust and comprehensive training requires timely procurement of targets, ordnance, training devices, simulators, and related equipment/facilities. Equally important to the quality of our training is funding for operations and maintenance. O&M,N operates our schools, training ranges, simulators, and adversary squadrons. It funds our detachments, and it determines our flying hour program. Not surprisingly, small adjustments to this funding have major impacts on the fleet's ability to operate modern weapon systems.

The T-45 Training System, and I stress system, consists of the T-45A "Goshawk" jet trainer, state-of-the-art visual and instrument simulators, computer based training integration system (TIS), computer aided instructional devices, academics, courseware, and contractor logistics support. The first four aircraft have accumulated 800 flight hours toward accomplishing flight test goals. Military construction at the first base, NAS Kingsville, Texas, has been completed and the first simulator has been accepted. The Training Integration System and associated academics are also close to government acceptance. Initial Operational Acceptance (IOC) has slipped 18 months, to November 1992, due in part to the contractor decision to move production from Long Beach, CA, to St. Louis, MO. Recent progress in all areas of this program indicates that we will have a safe, quality system for training Naval aviators well into the 21st century.

Aircraft Modifications. The fiscal year 1992 request of $1,545 million funds both procurement of kits/material and installation on a full-funding basis in accordance with the policy change directed in the fiscal year 1990 Appropriations Act. Modern-

ization, as reflected in the APN-5 account, provides the means to improve and sustain operational capability, maintainability, readiness, and safety emergent issues associated with all aircraft platforms.

Aviation Support Equipment. Our request for support equipment in fiscal year 1992 is only slightly increased over the amount appropriated last year. Prior year appropriations have been dedicated to fully outfitting our deployable carriers, replacing obsolete equipment at our shore facilities, and providing equipment aboard the Maritime Pre-Positioned Ships as part of the Rapid Deployment Force. Full funding as requested in fiscal year 1992 is required to provide continued support of the Consolidated Automated Support System (CASS), CV replenishments, required support equipment for aircraft procurement, replacement of obsolete equipment, and continued support of out-of-production aircraft, e.g., A-6, S-3, and H-2.

It should be noted that in the near term, when an increasing number of our aircraft inventory consists of out-of-production aircraft, support costs for these aircraft must increasingly be borne in the support equipment, vice aircraft new production accounts.

The CASS program, which has been developed specifically to reduce support costs, has entered Low Rate Production. Full rate production, originally scheduled to begin in late fiscal year 1991, will not occur until early fiscal year 1992 in order to allow resolution of software deficiencies discovered during TECHEVAL. CASS is essential for providing a fiscally and technologically sound approach for the support of all future aircraft and avionics systems. CASS offers significant cost avoidances in manpower, training, support equipment, operating costs, and space contributing significantly to combat readiness.

READINESS AND SUSTAINABILITY

The fiscal years 1992-1993 budget is balanced within fiscal constraints to provide the best attainable readiness by Naval aviation tactical forces through prudent investments in training, personnel, and material support programs.

Flying Hours—An Imperative for Fleet Readiness. The standard readiness indicator for the flying hour program is the primary mission readiness (PMR) attained by warfighting units (TACAIR/ASW). For each type aircraft, a pilot needs to be trained in various mission skills—skills which must be continually renewed for proficiency. Through experience, we have determined the average number of hours per month required to achieve and maintain these skills. Our budget development process identifies the flight hours necessary for training in each primary mission area. The fiscal years 1992-1993 budget request is sufficient for us to achieve 83 percent of that training through flying and an additional 2 percent PMR through the use of simulators. The planned 85 percent PMR, while below our peacetime goal of 88 percent, will provide the required level of training necessary to maintain aircrew readiness. We know that further reductions will result in a loss of readiness, a reduction in safety, and a decline in aircrew retention.

The average TACAIR/ASW crew is funded for 24 hours per month. We believe this reflects the level required for retention of critical combat flying competence, comfort, and confidence. Air wings preparing for deployment and those already deployed are accorded priority for flight time while those returning receive less. It must be emphasized that the opportunity to fly is *critical in the retention of aviators.* We are closely monitoring Naval aviation's contribution to counternarcotics operations and capitalizing, when possible, on training and readiness opportunities.

Airspace. Another separate, but related, issue is the availability of adequate special use airspace to maintain Naval aviation readiness. Special use airspace is essential for attaining and sustaining acceptable flight crew proficiency across the full spectrum of warfare, for developing and evaluating airborne tactics, and for testing and evaluating advanced technology aircraft and weapons systems. Low observable and terrain hugging aircraft, high-speed missiles, and over the horizon standoff weapon systems and tactics are but a few examples of added capabilities that place increased demands on available air and sea space.

Continued emphasis on joint operations, while appearing to provide relief, actually places additional demands on existing airspace assets and results in increased frequency of use. Available airspace is under constant pressure from commercial air, economic, political, and environmental sources. Each source is represented by special interest groups which compete with military interests. The Navy is faced with the dilemma of needing increased airspace to support emerging capabilities, while external pressures prefer reducing and restricting available operating areas for Naval testing and training activities which places readiness at risk. We are seriously addressing the myriad of related problems through improved management of our

airspace assets and better coordination of our operations with the other military services and the Federal Aviation Administration.

Aviation Spares. Our fiscal years 1992–1993 initial aviation spares requirement was computed using a readiness-based sparing model. This model optimizes readiness within available funding and specific mission goals. The outfitting portion of our spares requirement is less than previous years but represents acceptable funding levels which will require continued management efforts to balance requirements with available funding.

Aviation Depot Maintenance. Depot rework funding declines from fiscal year 1991 to fiscal year 1993 as a result of the overall reductions and depot consolidation efficiencies with a concurrent increase in aircraft, engines, and missiles overdue for maintenance. The growth in fiscal year 1992 and fiscal year 1993 backlog is a result of the decreased funding and carry-over of unfunded backlog from previous years.

Aircraft Material Readiness. While many factors, including personnel, training, general logistics support, spare parts, and depot rework funding all affect material readiness, the primary indicator used to measure aircraft material readiness is the Mission Capable (MC) rate. The MC rate goal is 73 percent, which has not been achieved since fiscal year 1988. In fiscal year 1990, we achieved 70 percent. In fiscal year 1991, we expect 68 percent. The decrease is a result of reductions in funding since 1987 in areas affecting MC rate. Additionally, in fiscal year 1990, aircraft readiness reporting procedures were changed to include all aircraft in the custody of a squadron regardless of whether or not the aircraft was undergoing depot repair at the squadron. The new procedures provide a true readiness picture. Our goal of 73 percent is still valid. The fiscal year 1992 MC rate is projected to remain stable at 68 percent.

WEAPONS DEVELOPMENT/PROCUREMENT

Naval aviation continues to improve its weapons inventory through the "neckdown philosophy" outlined in our Strike/Anti-Surface Unit (ASUW) Warfare Master Plan. The essence of this approach to weapons procurement is to develop and create a family of weapons that will be versatile, low cost, possess inherent growth capability, and be compatible with all future warfighting capability well into the next century. An additional benefit of this approach is the consolidation of numerous and varied types of weapons into "families" of weapons which will reduce training and logistical requirements which translates into significant monetary savings. The Advanced Interdiction Weapon System (AIWS) and the Advanced Bomb Family (ABF) are keystones of the Strike/ASUW Master Plan.

Another significant issue related to air launched weapons is the loss of the A–12. With the cancellation of the A–12 and the concomitant delay in the development and subsequent procurement of the next generation medium attack aircraft, development and fielding of accurate standoff, air-launched, air-to-ground weapons assumes an even greater importance for aircraft survivability. As the threat on the battlefield increases, standoff weapons improve the survivability of strike aircraft by creating a sanctuary from which weapons can be delivered outside of defenses in the initial stages of the conflict, before enemy air defenses are suppressed. In the recent Desert Storm conflict, the Standoff Land Attack Missile (SLAM) performed superbly in that role. With the imminent termination of SLAM production, the Advanced Interdiction Weapon System (AIWS) is critical to the future of Naval aviation strike warfare. The AIWS will provide our aircrew the ability to strike highly defended targets from low altitude and medium range, avoiding point defense systems and reducing the aircraft's threat exposure. The AIWS is scheduled to replace our inventory of aging air-launched air-to-ground precision guided weapons in keeping with the neckdown philosophy of weapon development/procurement. Our budget requests of fiscal year 1990 and fiscal year 1991 were both reduced significantly by committee action which has resulted in the delay of this critical program 2 years beyond its originally programmed date. We strongly believe that the funding requested in the FYDP is needed and feel that it is absolutely vital to ensure the survival of our attack aircraft in any future conflict.

In the area of air-to-air weapons, the emphasis has been on a balance of capability, affordability, and commonality with the U.S. Air Force. The Navy and Air Force have a fully integrated Joint Air to Air Missile Plan that guides all air to air missile developments. In October 1990, a Joint USN/USAF Program Office, with the Navy as executive service, was established for short range missiles. The current large inventory of AIM–9M Sidewinders is being modified with improved Infrared Counter Countermeasures (IRCCM), while the AIM–9R, offering a much improved acquisition range, continues development in FSED. The USAF is the executive service in the Joint Program Office for the Advanced Medium Range Air-to-Air Missile

(AMRAAM), which offers multiple shot and launch and leave capability as improvements for the missile it will replace, the AIM-7 Sparrow. In long-range missiles, the Navy is the executive service for the Advanced Air-to-Air Missile (AAAM) which is in Demonstration and Validation, with two different concepts being evaluated. It will offer greatly improved kinematics and maneuverability over the AIM-54 Phoenix, and be compatible with all U.S. fighters. All development is monitored by the Joint Air-to-Air Missile Office (JTAAMO).

SUMMARY

As a maritime nation and free-world leader, sea power is essential to our economic vitality and national security. Naval aviation is the critical component of sea power that adds speed, altitude, reach, and concentrated fire power to our power projection forces. Carrier based aircraft, unencumbered by basing or overflight rights, are capable of providing the right amount of force at the right time. Whatever the challenge in our changing security environment, national decision makers will continue to rely heavily on Naval aviation in response to a crisis. Our response and combat success in the Persian Gulf clearly highlight the utility and necessity of top-notch carrier aviation forces.

Our people must always remain our top priority. The success story of Operation Desert Storm is the outstanding performance of our men and women in uniform. They ask very little, they endure the sacrifice of extended deployments, and they routinely put their lives on the line for our national security. Their deep sense of commitment and patriotism deserves our utmost respect and recognition in terms of adequate pay and benefits to ensure their quality of life. This is a key element in protecting our national investment in a ready Navy.

The FYDP reduces Naval aviation budget authority and force structure to 13 total aircraft carriers. The carrier battle group and its airwing remain our primary force for power projection and the centerpiece of a balanced fleet. Maintaining its technological edge is of paramount concern. As we build down and restructure, it is absolutely vital that we achieve a balanced Naval aviation force structure that is optimized and modernized across all mission areas. Achieving this objective within projected fiscal constraints is certain to be one of our most difficult challenges.

Naval aviation makes extraordinary contributions to national security. The continued support of Congress in protecting our investment in modernization and a balanced force structure, coupled with the dedication of our courageous sailors and marines, will ensure our success during any future crisis.

Senator LEVIN. Thank you. Mr. Cann.

STATEMENT OF GERALD A. CANN, ASSISTANT SECRETARY OF THE NAVY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

Mr. CANN. Thank you, Mr. Chairman. I have a prepared statement which, with your permission, I would like to have entered into the record.

Senator LEVIN. It will be made part of the record.

Mr. CANN. It explains my acquisition philosophy and provides an overview of the extensive organizational changes I have made since my confirmation just over a year ago. It also includes a summary of key naval aviation programs.

As Admiral Dunleavy indicated, modernizing our naval aviation assets is essential if we are to maintain the versatility, quick response, and flexibility that are the hallmarks of our country's naval aviation program.

I would like to just go back a step to the early days of Operation Desert Shield. The first major power projection force to arrive was the *Independence* battle group which was within strike range of the Iraqi forces on the 6th of August and ready to engage. Our cry of, "We are ready now," could not be more aptly demonstrated. Three days later the *Eisenhower* battle group arrived in the Red Sea and was ready to strike Iraqi targets. The ability of the Navy aircraft carrier with their embarked airwings to go in harm's way at a mo-

ment's notice and conduct sustained power projection has never been matched by any other deployable asset.

Admiral Dunleavy has described where we are in the naval aviation mobilization plan. The Navy's fiscal year 1992 budget submission, together with the amendment to the President's budget, presents a program that takes into account individual program status, the changing world situation, fleet needs, and budget realities. This modernization program is achievable and necessary to ensure that naval aviation does not enter a tailspin shortly after the turn of the century when replacement aircraft will be needed.

The amended budget submission was forwarded to Congress on the 26th of April of this year. With respect to the changes proposed in fiscal years 1992–1993, it is requested that these revisions be considered as part of the fiscal years 1992–1993 appropriation approval process. Changes have also been proposed involving realignment of the fiscal years 1990 and 1991 funds. Since it is important that some of these efforts commence as soon as possible, congressional approval of the fiscal years 1990–1991 funding revisions is requested prior to the summer recess.

Going on to the A–X program, the A–X program will design and develop the next generation all-weather medium attack aircraft. The budget amendment includes provisions that will support a concept exploration phase for the A–X beginning in fiscal year 1992. This would lead to the engineering and manufacturing development phase in fiscal year 1997 and production commencing in fiscal year 2002. Currently, the operational requirement for a long-range, all-weather, night capable, survivable medium attack carrier capable naval system is undergoing a complete review. We are studying the full range of alternatives for this medium attack replacement system.

We are going into the A–X with our eyes open. The lessons learned from the A–12 cancellation will be incorporated into the A–X program from the beginning.

The other major program in the modernization effort is the F/A–18E/F upgrade. This stretched version of the F/A–18 will provide additional range and payload needed to maintain the F/A–18's effectiveness and growth potential into the next century. The F/A–18E/F supports both Navy and Marine Corps requirements with a proven force multiplier capable of close air support, air superiority, fighter escort, and interdiction.

Congressional support for naval aviation programs is well appreciated. It is clear that continued congressional support will be needed to carry on the work necessary to maintain our naval aviation assets and our Nation's naval power projection capabilities in the next century. And with that, Mr. Chairman, we are prepared to answer your questions.

[The prepared statement of Mr. Cann follows:]

PREPARED STATEMENT BY GERALD A. CANN, ASSISTANT SECRETARY OF THE NAVY (RESEARCH, DEVELOPMENT, AND ACQUISITION)

NAVAL AVIATION MODERNIZATION REQUIREMENTS AND ACQUISITION PLANS

As the Navy Acquisition Executive, I am responsible to the Secretary of the Navy for all acquisition matters including research, development, systems and platform production, shipbuilding, and associated support programs. My primary function is

to provide acquisition policy, procedures, and oversight of the administration of all Navy research, development, and acquisition programs. Following the validation of a fleet requirement by Joint Requirements Oversight Council (JROC), the Chief of Naval Operations or the Commandant of the Marine Corps, and after appropriate programming and budgeting of resources, responsibility for transitioning the requirement into a piece of functioning hardware ready for operational test and evaluation and fleet introduction falls within my purview. My goal is to ensure that all programs are well run, technically feasible, and adequately funded.

Maintaining and modernizing our Naval aviation assets continue to be an important part of the Navy acquisition program. During the past year several problems, most notably termination of the A-12, have adversely impacted our long term modernization plans. The Navy's fiscal year 1992 budget submission, together with the amendment to the President's budget, presents a program that takes into account individual program status, the changing world situation, fleet needs, and budget realities.

The A-12 program was terminated in January 1991 due to failure of the contractor to perform to the contract requirements. The decision to terminate the A-12 was made when it became clear that the magnitude of schedule and technical risk had become unacceptable. The schedule for the first flight had slipped 2 years from June 1990 to sometime between March and September of 1992. This schedule delay was primarily the result of redesign due to weight growth and manufacturing problems associated with the use of high performance composite materials. Other areas that were identified as entailing technical challenge included software development, ESM system development, multi-function antenna performance, and auxiliary power unit incompatibility with aircraft carrier operations. Additionally, estimates of the ultimate cost to complete the A-12 full scale engineering development contract varied, but were well above the contract's ceiling price of $4.8 billion.

The requirement to replace the medium attack capability embodied in the A-6 and similar in capability to the canceled A-12 program still exists. The budget amendment provides for near and longer term programs to address these requirements: It is important that our Navy maintain its mission essential power projection capabilities during the time it will take for a deliberate, well structured acquisition program to design, develop, and produce a replacement for the A-6.

To bridge the development gap and ensure a continuous medium attack all weather capability, we need to modify the A-6 aircraft to keep it viable into the next century. As the necessary first step, we plan to rewing an additional 120 A-6E aircraft with composite wings. The President's budget requested funds for 60 rewings and the amended budget request requests 60 more. This will remove the flight restrictions on these aircraft and allow us to take full advantage of their remaining service life. The A-6E will also receive survivability improvements. Planned modifications include the A-6 System/Weapon Integration Program (SWIP) upgrades. These upgrades will improve standoff range with HARM, HARPOON, Infrared/Laser Mavericks, Skipper, and SLAM weapons systems and improve survivability and reliability with a new computer, Inertial Navigation System (INS), Heads Up Display (HUD), and Integrated Defensive Avionics Program (IDAP). These improvements are necessary to buy the time required to allow a mature development and procurement process for a follow-on system.

The AX program will design and develop the next generation all weather medium attack aircraft. The budget amendment includes provisions that will support a demonstration/validation phase for the AX beginning in fiscal year 1992 leading to the engineering and manufacturing development phase in fiscal year 1997 and production in fiscal year 2002. Currently, the operational requirement for a long range, all weather, night capable, survivable medium attack carrier capable naval system is undergoing a complete review. We are studying the full range of alternatives for this medium attack replacement system.

The AX program as currently envisioned includes open competition for concept exploration with award of up to five concept exploration contracts. The program would then downselect before the demonstration and validation phase. Emphasis during this phase would be in risk reduction in manufacturing, materials, and propulsion. The requirement for a flying prototype will be included in the demonstration and validation process. We also envision that specifications and requirements should remain evolutionary during this process in order to allow latitude for weight and cost savings trade-offs to enhance producibility and affordability.

During the engineering and manufacturing development and production phases an integrated master plan relating cost and schedule performance must be in place. A government oversight team in place at contract award to monitor contract performance is an essential element of this effort. Milestones will be event based vice

calendar based. Extensive testing and evaluation will be conducted to contain technical risk. Care must be taken to protect the technology and capabilities of this system from unauthorized disclosure while allowing sufficient access to the program to allow proper cost and performance analysis and oversight. We anticipate that only selected technologies and information related to stealth will be classified as special access.

In order to fulfill the multi-mission requirements of attack, fighter escort, and short to mid-range intercept, we plan to increase production of the C/D model of the F/A-18 dual purpose aircraft to 48 per year in the near term and 54 per year longer term. This higher production is necessary to support carrier airwing force structure requirements. In addition, we will begin development of a major upgrade to the F/A-18. The F/A-18E/F represents a natural evolution of the F/A-18. Acquisition of the F/A-18E/F with its improved range and gross weight capacity is the follow-on and replacement for the F/A-18C/D.

The capability of the F/A-18 has grown over the years with the addition of new and upgraded avionics, sensors, and weapons. These improvements have resulted in a night attack capability, multi-sensor integration, a radar upgrade, and additional weapons capabilities. With these improvements, however, the F/A-18C/D is reaching its weight limits and further growth is not possible without a major structural modification. This new upgrade will provide for acceptable bring-back loads for carrier operations as well as provide the additional range and payload needed to maintain the F/A-18's effectiveness and growth potential into the next century.

Recent reports from Desert Storm operations on the combat effectiveness, survivability, and reliability of the Hornet are impressive. Although the proposed F/A-18E/F is not a replacement for the A-6, it will enhance the strike capability in the carrier air wing, especially in the period between the retirement of the A-6 and the introduction of a follow-on system. The F/A-18E/F supports both Navy and Marine Corps requirements with a proven force multiplier capable of close-air support, air-superiority, fighter escort, and interdiction. The amended budget shifts funds in fiscal year 1991, and adds funds in fiscal year 1992 and in fiscal year 1993 for the F/A-18E/F development effort.

The T-45 Training System has undergone design and development modifications to correct deficiencies discovered during early developmental and operational testing. Recently completed technical and operational flight testing has verified correction of the major problems and supports continued low rate production. Aircraft deliveries are scheduled to resume in January 1992 from the contractor's St. Louis, Missouri facility. Over the next year the aircraft will continue flight testing with emphasis on carrier suitability, high angle of attack and spin testing, practice bomb and rocket separation, and envelope expansion. The fiscal year 1992 budget request supports a buy of 12 aircraft, completing the pilot and low rate initial production at 48 aircraft.

Air-to-air missile development programs continue on track. The Advanced Air to Air Missile (AAAM) program is in the second year of a 52-month demonstration and validation phase. In fiscal year 1990 the two competing joint venture teams began component and sub-system fabrication. System requirements reviews and critical design reviews have been completed for both concepts. Testing to date has been successful, including wind tunnel aircraft separation, sensor and guidance system design verification, and propulsion component ground testing. Ground propulsion testing will be conducted to validate performance predictions prior to carriage and launch from manned aircraft in fiscal year 1992.

The Navy and Air Force are fully coordinated on short-range air-to-air missile program strategy. Program responsibility for all Sidewinder and future short-range missile programs rests with the recently created Joint Short-Range Missile Program Office, established under an October 1990 Memorandum of Agreement (MOA) between the Navy and Air Force. The Navy and Air Force agree on evolutionary upgrades for Sidewinder to pace a rapidly evolving threat capability. The R&D program includes AIM-9R full scale development and concept exploration/demonstration/validation for future improvements to AIM-9. The AIM-9R, presently in development, will respond to the Infrared Countermeasure (IRCM) threat and provide significant improvements in seeker clutter rejection and acquisition range. Progress on the AIM-9R Sidewinder missile during fiscal year 1990 saw completion of several significant technical milestones including receipt of the first contractor produced hardware for testing and demonstration of counter-measure capability. All four test firings in fiscal year 1990 were successful. The missile has completed technical evaluation (TECHEVAL) and will begin operational testing (OPEVAL) in May 1991.

The baseline Advanced Interdiction Weapon System (AIWS) (submunition dispensing) is in the demonstration/validation phase which is scheduled to complete in

spring 1991. An open competition is underway for the engineering and manufacturing development phase of the baseline system. The developmental effort will begin with contract award in fiscal year 1992. Preplanned product improvements (P3I), planned to start in fiscal year 1994, will include evolutionary improvements such as terminal guidance, data links, and a unitary warhead to provide improved lethality and capability against an expanded target set.

Over the past year the Navy's acquisition chain of command has been redefined and streamlined. The crucial need for accountability and responsibility has been addressed and has been strengthened. The past year has seen an idea that previously existed only on paper become a functioning, dynamic organization that effectively supports the needs of the Navy and the country.

The organization put in place over the past year has reduced the layers of decision reviewers and approvers. This has empowered the Program Executive Officers and Direct Reporting Program Managers with the decision-making authority to effectively administer their programs. The Program Executive Officers and Direct Reporting Program Managers report directly to me and have full responsibility under me for program cost, schedule, and performance.

As a result of policy and organizational changes, we have significantly reduced the manpower requirements within the Navy's acquisition structure. My direct staff has been reduced from 270 to 167, a reduction of 38 percent. This is independent of ongoing reductions in the acquisition program management structure. Previous to my confirmation, 270 personnel were employed under the old organizations of the Assistant Secretary of the Navy for Research, Engineering, and Systems and the Assistant Secretary of the Navy for Shipbuilding and Logistics, as well as in the Information Resource Management organization. We expect to achieve significant additional reductions of my staff by next fiscal year. The acquisition program management work force is in the process of implementing a 4 percent per year cut in accordance with current legislation.

A redefined relationship with the Office of the Secretary of Defense, Office of the Chief of Naval Operations, the Commandant of the Marine Corps, and the Naval Systems Commands complements the internal reorganization. These revised relationships have reduced the redundancy and duplication of effort between organizations, improved communications, and fostered better coordination between the acquisition functions of these staffs.

The constrained fiscal environment that we find ourselves in today requires a combination of innovative strategies and time tested methods to ensure the future defense needs of the country are met. We are embarking on a program to reduce technical and cost risk in order to ensure our investments in the Navy of the future are wisely spent. A strategy of event based contracting and assurance that a system is fully operationally capable prior to full rate production are essential elements of this program.

Positive control of all aspects of the acquisition process is an essential element of a coherent acquisition strategy. We are enhancing our ability to provide appropriate oversight of all programs by increasing our focus on technical and cost analysis. Cost risk is analyzed and quantified by thorough use of cost performance indexes and other available data. The results are tempered with good judgment and reviewed in the context of the overall acquisition requirement. Technical risk is similarly measured, comparing progress against predefined milestone goals. Increased focus on cost and technical review is an essential element of successful acquisition management in a period of declining resources.

The ability of the program manager to make the decisions crucial to program execution without unwieldy review and approval processes is vital to the successful management of acquisition programs. Delegation of sufficient authority to Program Executive Officers and Program Managers is basic to streamlining the acquisition process. Inherent in this authority is commensurate accountability and responsibility. The focus on analysis mentioned above, combined with an increased emphasis on ethics, responsibility, and accountability are core values used to ensure that timely and accurate reports are provided to my office on the status of ongoing programs. This has been accomplished through training and a clear policy on reporting requirements. Of note, the lessons learned from the A-12 cancellation have been promulgated to all levels of management within the Navy's acquisition community.

Current fiscal realities demand a thorough review of contract methodologies to ensure that contracts are awarded in the best interests of the government while being realistic and achievable for the contractor. Contracting initiatives, such as dual sourcing, multi-year, and fixed price contracts, while still valid, require case by case scrutiny in light of the reduced quantities required for a smaller fleet.

The fiscal environment of the coming decade requires that adequate flexibility be provided in contracts tailored to the type of risk involved. The need to review contract risk very carefully in terms of cost, schedule, and technical feasibility is especially applicable to fixed price contracts. A realistic assessment of contractor performance and his ability to fulfill production requirements under the terms of all types of contracts must be continually monitored and appropriate action taken early to prevent occurrences of companies failing to perform.

The new decade and the apparent end to the Cold War era bring a new challenge to the Navy and the Department of Defense overall. The capitulation of Cold War foes has reduced the requirement to maintain the large active fleet we now support. Operation Desert Storm has demonstrated that traditional foes are not the only credible threat in a world where technologically advanced weapon systems are available on the open market. As the size of the fleet is reduced, maintenance of a qualitative edge over potential adversaries is imperative. This requires a continued investment in procurement and modernization of aircraft with a new generation of combat systems.

Recent world events underscore the necessity for the mobility, responsiveness, and technological superiority possessed by our Navy/Marine Corps in a world where it is increasingly likely that large U.S. forces cannot be based or garrisoned ashore overseas. The unprecedented and expeditious build-up of U.S. Navy and Marine Corps forces in the Middle East confirmed how vitally important our expeditionary capabilities are in supporting national priorities.

Over the next year the Navy will continue to institute new efficiencies in its acquisition structure in compliance with the Defense Management Review. A large part of the future of the Nation's maritime capabilities rely on today's naval aviation programs. I will continue the initiatives made over the past year in providing proper oversight for these important investments in our Nation's defense.

Last, congressional support for the Naval aviation programs is well appreciated. It is clear that continued congressional support will be needed to carry on the work necessary to maintain our Navy's excellent capabilities into the next century.

Senator LEVIN. Thank you, Mr. Cann. Let me just look back for a moment before we look forward because of the change in the signals that we have gotten here. Last year about this time Admiral Gentz responded to a question that I asked on the status of the A-12 by saying that the program is on schedule, on cost, and we are looking forward to getting it into the fleet. And then just 8 months later, the program was canceled because it was 2 years behind schedule and $2.5 billion over cost. What happened between May and January?

Mr. CANN. This is a pretty complex issue, as you probably would assume. Sometime in the November/December time frame of 1989, the contractors discovered that they had a severe weight problem. They knew they had a potential weight problem. In looking at their weight problem, they made projections. Then, of course, the Naval Air Systems Command was beginning to project some larger weight problems. They decided that the way to solve some of the weight problem was to redesign the composite wing boxes and some of the composite wing structures in such a way that they could take significant weight out of those structures.

In doing that, for example, in one of the major spars, which was a larger item, they went from 18 pieces of tooling to something like 96 pieces of tooling. Somehow, in their own internal process, they failed to pick up the impact of these major changes they were making to the manufacturing of the first article. Sometime in the March/April timeframe, this kind of information began to become apparent to planners in the two corporations, that they were, in fact, not going to be able to meet the first flight and not going to meet the schedule that they were on. They were also beginning to incur large cost overruns in their own projected costs for the air-

craft. It all started to become unraveled. To the best of my knowledge, the first time I heard about it was on the 1st of June when they came in to see me and told me that they clearly had a major problem.

I think that there are a lot of lessons to be learned from the A-12 from my point of view. One of the issues I think that created problems on the A-12 was the fact that when they decided to start this effort they marched into a program without a demonstration/validation unit. In other words, there was not a flying prototype, and there was a great deal of enthusiasm for getting on with it. The contractors proposed a first flight date that was, in retrospect, quite optimistic.

Also, as most people here are well aware, the Navy entered into a fixed price development, with the contractor willingly signing up for it with the idea that they would be able to do it. Now, in a fixed price development, the Navy's ability, at least as perceived at the time, to monitor day-to-day activities was somewhat inhibited because the contractor had a contract to deliver an aircraft.

So, I think that what basically happened was that we didn't have a good handle on where they were in their efforts to build the first aircraft, in their manufacturing processes; weight control was a problem; and finally, I think that the notion of a joint venture where there were two contractors, one contract with both contractors having equal responsibility without a clear-cut management organization, represented a serious problem. So, I think that to answer your question in brief, there was a failure to properly provide information up the line over a lengthy period of time until it started to come unraveled in the May/June timeframe last year.

Senator LEVIN. To what degree, if any, did the special access or the black security status of the program contribute to the problems in the A-12 program?

Mr. CANN. I think that from my look at this—and, of course, I did not really get into this until pretty late, but from what I understand, in the front end of the program, because of the requirement to clear people into special access programs, that there was a significant time lag in getting people cleared, getting facilities cleared, and getting them set up. I cannot assess for you here exactly what the impact of that was, but there was an impact of some kind. I do not think it was necessarily an impact that would have precluded the program from moving ahead smartly once they got those things under control. It might have accounted for some of the early problems.

Senator LEVIN. Is the summary then that you believe there was some impact because of the inability to have external reviewers, but not necessarily the cause and effect impact? Is that a fair summary?

Mr. CANN. Well——

Senator LEVIN. It is not the total causation, but it could be in your judgment part of the problem. Or is that putting words in your mouth?

Mr. CANN. I think that there clearly could have been a better job of oversight.

Senator LEVIN. Would that have been more available if it were not a special access program?

Mr. CANN. I know that has been an allegation. I guess to the extent that one could argue that some people in the Office of the Secretary of Defense and some other places within the Navy did not have access, it might have shown up some of these problems. But, I am pretty convinced myself that some of the problems that really were driving this were not apparent to anybody until about the end of 1989 or the early part of 1990. I do not think the people who were doing the work in the two organizations, General Dynamics and McDonnell Douglas, had a fundamental understanding of the problems they were getting into as a result of the redesign to support the manufacturability.

Senator LEVIN. Thank you. My time is up. Senator Wallop, I did not call on you for an opening statement when you came in. Perhaps you have one now.

Senator WALLOP. Mr. Chairman, I will just insert my statement into the record and yield to whomever was senior in time.

Senator LEVIN. Without objection, it will be so ordered, in addition to the prepared statements of Senator Dixon and Senator Thurmond.

[The prepared statements of Senator Dixon, Senator Thurmond, and Senator Wallop follow:]

PREPARED STATEMENT BY SENATOR ALAN J. DIXON

Mr. Chairman, it is a pleasure to have with us today Assistant Secretary of the Navy (Research, Development and Acquisition), Gerald A. Cann and Assistant Chief of Naval Operations (Air Warfare), Vice Adm. Richard M. Dunleavy.

I look forward to hearing from our distinguished guests on naval aviation modernization requirements and acquisition plans, especially in view of the recent dramatic changes in the world.

I am particularly interested to hear about the Navy's future plans for the F/A-18, Hornet, and the AV-8B, Harrier, programs. I understand these two systems performed remarkably well in Desert Storm.

I look forward to the testimony of our two distinguished guests.

Thank you, Mr. Chairman.

PREPARED STATEMENT BY SENATOR STROM THURMOND

Thank you, Mr. Chairman. Mr. Chairman I join you in welcoming Assistant Secretary Cann and Admiral Dunleavy to today's hearing on the Navy's aviation modernization program. Both Secretary Cann and Admiral Dunleavy have a key role in determining the future of Navy carrier aviation and I cannot think of two better champions for this important asset to our Nation's defense.

Mr. Chairman, we all are aware that the Navy's aviation program is at a critical juncture. During the last 2 years, the Navy canceled both the P-7 anti-submarine aircraft and the A-12 attack bomber because of cost and production problems. Both of these aircraft were key to the Navy's aviation program well into the 21st century. We are now faced with the vexing problem of providing the necessary funding for interim aircraft until the next generation of naval aircraft come off the drawing board.

Although I believe it is critical to our national defense that the Navy has sufficient numbers of capable aircraft to fill the decks of our aircraft carriers, I do not want to see the Department spend our precious defense dollars for systems that only partially meet the Navy's needs. In my judgment the plan proposed by the Department of Defense meets all the criteria of the Comptroller, but falls short of what our war fighters need.

Mr. Chairman, under your leadership and that of Senator Wallop, the ranking member, this subcommittee and the Department of Defense can work out a revised naval aviation modernization program. I believe the Navy's aviation needs can be met by a mix of upgraded F-14s, rewinged A-6s, and a number of F-18 Es and Fs built as strike fighter replacements. This mix will give us the "best bang for the

buck" without degrading our naval aviation capability until the new technology aircraft comes on line.

Mr. Chairman, the future of Navy aviation will be determined by our actions this year. We must ensure that our Navy continues to dominate the sea and is able to project its power well into the 21st century, when the next generation of naval aircraft come off the production line.

Thank you, Mr. Chairman.

PREPARED STATEMENT BY SENATOR MALCOLM WALLOP

Mr. Chairman, I join you in welcoming Secretary Cann and Vice Admiral Dunleavy to this very important hearing. The political attention given the cancellation of the A-12 program has, I know, compounded the Navy's problems in establishing an alternative plan that supports both:

— development of a next generation A-12 replacement; and

— choosing an interim capability which does not compete for funding with the longer term goal.

Therefore, I am particularly pleased that, as the title given this hearing suggests, we will be focusing on the Navy's near and long term requirements as a basis for a resultant acquisition strategy.

Mr. Chairman, I believe that focusing on the Navy's requirements for medium attack capability as modernization plans are developed provides the best means of guaranteeing that the power projection role of tomorrow's Navy remains ready for any challenge. A modern, next-generation A-X aircraft to project power ashore will ensure that our carrier battle groups will remain capable of providing the flexibility and critical ability to project power which has proven so essential in numerous crises.

In closing, let me again thank our witnesses for sharing their valuable time and experience with us today. To them, and to you, Mr. Chairman, I renew the pledge which I made during our first subcommittee hearing earlier this year, to strongly support advancing technologies and capabilities so as to never allow the dedicated men and women who will defend our country to enter combat without the very best equipment that technology will provide.

Thank you, Mr. Chairman.

Senator LEVIN. Senator Cohen.

Senator COHEN. Admiral, perhaps we can talk about what some of the options are in terms of the follow-on to the A-12. Would you agree that it is probably politically difficult, if not impossible, to have a resurrection of the A-12?

Admiral DUNLEAVY. Senator, we have taken the operational requirement back inside the blue suit Navy, and we are rewriting the A-X——

Senator COHEN. Let me suggest to you it is politically impossible to resurrect the A-12. That would be my suggestion.

Number two, it is probably very difficult to start with a clean sheet. You would just start all over again and let's have a follow-on to the A-12. We will start over. That is probably not feasible at this time for a couple of reasons. Number one, the IOC will probably be pushed way into the future and it would be probably even more expensive.

A third option would be to perhaps missionize the strike role for an aircraft, and that would be what I think you are doing right now, trying to go back and see if you cannot pick up the amount of funding. I think you had about $142 million in the design for the A-12 that is already in there and been spent. Is that right?

Admiral DUNLEAVY. Let me back up to the first part of your question, Senator.

Senator COHEN. It really wasn't a question.

Admiral DUNLEAVY. Your statement. We feel strongly that we have to replace the A-6. We have to have an all-weather, long-range attack aircraft to replace the A-6. So, in one way we are going back to square one and saying, what is that aircraft going to look like? What do we need on that aircraft to replace the A-6?

Senator COHEN. Basically you are going to try to utilize, I would assume, or capture the $142 million that has already been spent for the funding for the design work, aren't you?

Mr. CANN. You mean for the A-12?

Senator COHEN. Yes.

Mr. CANN. Well, there are some things to capture out of the A-12, but it is certainly not going to be the design effort.

One of the problems with the A-12 that helped create the situation we are now in is that in the original requirement we attempted to put all of the ordnance inside the aircraft to preserve stealth. I think that one of the lessons that was learned from the Operation Desert Storm action and also in our relook at the operational requirement that Admiral Dunleavy was talking about, is we have recognized that what we need in the front end of a combat situation is the ability to have real stealth, if you will, and take a certain amount of ordnance in the aircraft. Once you have suppressed the defenses, then you can go to wing stations for the rest of the ordnance. We paid a tremendous penalty in terms of the box structures required to store the weapons in the A-12, and that led to the significant weight growth.

I would say that from a design point of view, any new design that we would undertake would not be a repeat of the A-12 per se. It would allow us to have a much lighter aircraft, give us more flexibility and growth, and also allow us to trade off stealth requirements with other survivability requirements. So, we are looking at a completely different approach to this.

Senator COHEN. You are going to start basically from scratch then?

Mr. CANN. Well, the answer to that is yes and no. The reason I say yes and no is we are going to start from scratch from the point of view that we are going out with a new procurement. But, the answer is no from the point of view that we hope to have sufficient flexibility in our approach that people who have been working on the ATF and other aircraft will be in a position to bring to bear all the lessons they have learned in some of the activities that have come out of the ATF designs and some other activities, and the A-12 designs, the good parts of the A-12 designs.

Senator COHEN. What do you plan in terms of the F-14 currently? What are your plans for the interim use of the F-14, if any?

Admiral DUNLEAVY. The F-14 will remain in the fleet until probably the year 2005-2006. What we hope to do as part of the plan is to upgrade some of the older F-14As, the ones with relatively few flight hours, and upgrade them to an F-14A plus—in other words, give them a digital capability and possibly an upgraded engine so they can maintain viability as a fighting force out to the year 2005, when we gradually transition from the F-14D into the F/A-18E/F. So, we do want to modernize some of our F-14s. Senator, may I go back to the A-X OR, operational requirement, for a minute?

Senator COHEN. I just wanted to find out, you are going to upgrade the F-14s, move it from analog to digital?

Admiral DUNLEAVY. Yes, sir.

Senator COHEN. You're going to upgrade, I assume, the engine performance on that as well?

Admiral DUNLEAVY. We hope to. We are still working those problems out, examining if we can afford to upgrade the engines.

Senator COHEN. Is there any concern on your part as far as the upgrades of the F-18 that you may put so many stealthy characteristics in the F-18 that you might preclude going to the A-X?

Mr. CANN. No.

Admiral DUNLEAVY. No, sir.

Senator COHEN. I'm talking in terms of funding. In other words, you start using up a lot of money making changes and putting certain characteristics into current aircraft, and then you find you do not have the money down the line, and there goes the future system you're looking for. Is there any concern on your part about that?

Mr. CANN. I would say that if changes are going to be made to the F-18 aircraft to take care of those sorts of things, they are going to be nominal at best. The issues in the F-18 E/F are primarily structural because you have to make it larger to increase its "bring back" capability. Also, there are some avionics improvements and so forth. But, the kind of avionics efforts you are talking about are not extensive and will not result in extensive improvements either.

Senator COHEN. Admiral Dunleavy, you wanted to go back to the original question?

Admiral DUNLEAVY. When the operational requirement is published, you will see that we have opened up the specifications of the A-6 replacement. Industry can now come back and give us a wide range of options to answer that operational requirement. We are not dictating what those options are, nor are we saying give us back an A-12. We do not want that, but it could be a son of A-12, or it could be on the other end of spectrum, a derivative of the ATF, or something completely new. So, we have revised many of the original requirements we had in the A-12 such as internal payload as Mr. Cann mentioned, and the all-aspect very low observable requirement. We now have some external carriage. So, we have completely rewritten the specifications of the A-X. It may encourage a broad spectrum of replies from industry, and that is what we desire. However, most importantly we want a survivable aircraft. And one of the questions we are asking is how much stealth is enough.

Senator LEVIN. Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman. Following up on some of those same questions, do you have an estimate of how much it will cost to upgrade the F-18 if you go that route?

Mr. CANN. You mean for the E/F?

Senator GLENN. Yes.

Mr. CANN. The R&D for the program to get to a total E/F program is on the order of $3.5 billion to $4 billion. It's a fundamental redesign of the airframe itself. It utilizes a large portion of the F/

A-18 avionics and will look like an F-18, but it is larger. It is going to have an additional 3,000 pounds of internal fuel.

Senator GLENN. Well, have you gone past the point of decision on that, or are you still considering the F-14? Is one program still being compared against the other? Because it would seem to me that what you are doing is spending about $4 billion to upgrade the F-18, and Grumman, according to press reports, has offered 132 F-14s at a fixed price of $4 billion. And you already have the airplane with the hard points built into it. It was originally designed as an attack airplane anyway. Are you still considering that? Because what you are doing is talking about a stretched F-18 for $4 billion, and you could get 132 F-14s for the same $4 billion conversion cost. Well, maybe that would be the total cost. I don't know. How do those things compare? I am a little confused here.

Mr. CANN. Let me try to put it in perspective if I can. First of all, the Grumman proposal that has been circulating indicates that they would provide F-14s at a unit cost of $33.3 million per aircraft. Of course, that did not include any of the government furnished equipment that has to go in the aircraft to make it airworthy. The Naval Air System Command's and my program executive officer's estimate for that, when you add in the engines the GFE electronics, armament, other GFE, and some other activities, brings you up close to $56 million per aircraft. For example, the engine accessories were $7.7 million. The GFE electronics were $10.3 million, and that did not include such things as integration of the IR Maverick, laser guided bomb integration, moving map, several other display functions, and so forth. So, while it was an attractive proposal, on an apples-to-apples basis it certainly was not in our judgment a——

Senator GLENN. Well, you would have a lot of the same GFE and so on on the F-18 too, though, wouldn't you?

Mr. CANN. A lot is already integrated into the F-18 because the F-18 was designed as a swing aircraft, both fighter and attack. I think the other point I have to make is that part of this analysis that got us into the mode of deciding that we needed to build F-18s and a large number of them was because of budget constraints. We wanted to get a large number of aircraft bought, and to single up into the F-18 line allowed us to start to buy at an economical rate. Part of the budget amendment includes buying more Cs & Ds over the next few years. As you raise the number of Cs & Ds, the unit price comes way down. We are going to be buying Cs & Ds at a fly-away cost in the mid-$20 millions and I think the procurement cost is around $35 million.

Senator GLENN. It appears to me that what we are doing—and correct me if I am wrong here, since you have gone into it, obviously, in more detail than I have—is spending $4 billion on the F-18 to try to get what we already have in the F-14 without making a basic change in the airframe or anything. We are trying to upgrade performance on the F-18. We are trying to give it more load. We are trying to give it more range, all things that the F-14 already has. These things have already been designed into it, have been proven. They would not have to be changed at all. Or am I wrong?

Admiral DUNLEAVY. Senator, we have given this a heck of a lot of study the last 6 or 8 months with a great deal of fleet input in-

cluding commanders, captains, majors, and light colonels, working side by side, to come up with the best decision for us operationally and fiscally for the next 20 years. Comparing the aircraft side by side, operationally they are about a wash in all configurations. But in the long haul, comparing the F/A-18E/F and F-14D Quick Strike, with comparable capabilities, you end up saving about $9.3 billion over the next 20 years. The savings are derived from lower operational costs, reduced manning, increased survivability, and better maintainability.

Furthermore, when we start procurement of aircraft in large numbers, a significant savings is achieved with the F/A-18 lower cost. When it comes down to operations on a day-to-day basis, we realize even greater savings. In addition, you would have to upgrade the F-14 to make it more survivable because of its greater vulnerability area as compared to the F/A-18. This would require approximately as much funding as the F-18 upgrade program. There are all kinds of modifications required in order to make the F-14 a true strike fighter.

Our decision, looking back on it, the necking down, in order to meet fiscal constraints, generated a requirement for 60 fighter attack aircraft on our flight decks. The best mix, after all the analyses, is 40 strike fighters and 20 A-Xs, and the best strike fighter is the upgraded F/A-18.

Senator GLENN. Okay, let me talk about your 60 airplanes a minute because I agree with you. That is what we need, and I do not quarrel with that at all. But what we are talking about is a whole developmental program here as opposed to having something that is on the shelf right now. You are talking about an A-X. We do not even know what the A-X is yet, and the Navy's ability in the last few years to manage a program like that has been atrocious. It has been terrible. And so, we do not even know how this one is going to be managed, whether we are going to have an A-X. We do not even know what the thing is going to do yet, or when we will ever get it. And now we are talking about taking the other part of that program, the strike fighter, the 40 airplanes, and they are going to be a development program too. We are going to take an existing airframe, try to stretch it out, load it up, give it more range to do something that we already have an F-14 there that can do it.

Now, it may have more development capability in the future, but I think you are betting everything on the outcome here. And I have spent enough time in the test business, as you have too, to know that it does not always work out that way. And you could come a cropper on a dozen different things with the F-18E/F. You know that right now as you plan to go into a stretch aircraft with different aerodynamics and different loads and different flight characteristics and so on. I just think you are risking everything on one roll of the dice out here all at once, risking every blooming thing you have on the carriers, and I question whether that is the way we ought to be going.

My time is up; I will have to wait for the next round here, but you propose to go with a brand new development F-18 out there. That is not going to be the same airplane. It is going to be a

stretched aircraft to get the characteristics you have to have, and we have not even designed the A-X yet.

Mr. CANN. Could I make a couple of comments please?

Senator GLENN. My time is up anyway. Go ahead. It is your time.

Senator LEVIN. You can respond.

Mr. CANN. Part of the issue is if you look at the current F-18 versus the F-14, one of the big problems we have to face up to is the whole question of life cycle cost, as you are well aware. The F-18 is almost three times more reliable, has two times better maintainability, and has a 50 percent better safety record than the F-14. I am not trying to run the F-14 down. These are just flat numbers that come out of the maintenance records and other records. Also, the F-18 requires about 25 percent fewer maintenance personnel and costs about 25 percent less to fly.

Senator GLENN. They are all excellent considerations, I agree. But will the F-18E/F do the same combat job? What is the combat bottom line? Will it have the same range, payload, and accuracy? We do not know that because it is an airplane that is still being developed out of an old one.

Admiral DUNLEAVY. The F/A-18, sir, is probably the best strike fighter ever produced. It is an exceptionally accurate aircraft. The weapon system integration we have in the F/A-18C/D should be incorporated and improved in the F/A-18E/F. In fact, that is what we are planning to do. It has the ability to put bombs on target.

One of the other compelling arguments for F/18E/F is greater commonality within the Navy and the Marine Corps. So, again, given fiscal constraints, we will man our flight decks and Marine squadrons with the F/A-18 upgrade program and we will get the most cost effective bargain.

Granted, we are going from a basic F/A-18 to a stretched F/A-18. It will about the size of an F-4, probably 3 feet larger all the way around, with upgraded engines so it will have the same dexterity that the old F/A-18A had when it first came to the fleet. The basic F/A-18C/D has no more growth potential because of the size of the aircraft. By upgrading to the E/F we have the ability to continually upgrade that aircraft for the next 20 years as new capabilities are developed. Yes, we are taking risk by going forward with it, but it is a calculated risk. And we have confidence in our people to produce it.

Senator LEVIN. Thank you, Senator Glenn. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman. Secretary Cann, with regard to the A-X acquisition, your opening statement addresses this program at length, or at least the one that you submitted. I wonder if you would take a minute and describe specifically your thoughts on how this acquisition will proceed and what will be included in it to avoid the pitfalls that we had in the A-12.

Mr. CANN. I have been involved in development programs for 37 years both in and out of the government. I find that the best way to develop a program is to do most of your work at the front end. It is very important to get the technology that you need in hand. Also, no matter what kind of program it is, that you have some kind of a prototype that you can actually fly so that before you get yourself committed to a full scale development program, you actu-

ally have some understanding of the flying characteristics of that airplane.

I do not mean integrate all the weapons into it because that is something you can do later, but you need to understand what the weights are going to look like. Weight control has been a major bugaboo in the development of naval aircraft. We are weight constrained because we have to land and take off from carriers.

The problems on the A-12 were that it was an optimistic program. It was a "fixed price" development. It was based on a contractor proposal and a contractor promise that they would meet a series of schedule dates, which they did not meet. We could not even predict when they would meet them when we finally terminated the program.

What I would like to do is run a concept formulation which allows us to trade off in detail between, say, up to five contractors a series of concepts that they will put on the table. After careful evaluation on our part, where we run our own simulation of each of their concepts, we will select one of the concepts and then work with them so that we get a flying prototype. As soon as we get enough information on the characteristics, we will establish exit criteria for getting out of the prototype program. We would then get a flying prototype and meet those exit criteria. We would go into full scale development with that aircraft. With that kind of knowledge, we should preclude the kind of problems that we had in the A-12. In addition to that, we will only have a single prime contractor. I frankly do not want to get involved in any more programs where we have joint ventures where it is not clear who is in charge on the contractor side.

Now, there has been a lot of discussion about the time factor and how long it takes to do this. I have spent a lot of time in the last several months looking at what it has taken to develop various naval aircraft and other aircraft. I found it takes on the order, depending on what you are looking at, 11 to 15 years to field a weapons system of the type we have. It took 13 years for the total F-18 evolution. It is going to take somewhere in the neighborhood of 13 to 15 years for the ATF.

I even went back and carefully looked at commercial aircraft to see how long it takes to field the commercial aircraft. The typical commercial aircraft takes about 8 to 9 years. They are infinitely simpler than the kind of aircraft we are trying to put together with the integrated electronics and integrated weapons systems.

So, I think that from our point of view and the recognition, and I hope there is on Congress' side—that the Navy needs to have this kind of a capability, we have to start this off in the proper fashion. I cannot do anything about what happened in the past, but I can certainly make sure that what we do in the future makes sense.

Senator WALLOP. I understand that and would not want to hang the A-12 on you. But I wonder if the procedure you just described does not have a time line on it that is perhaps too long for you to be able to make the decision, were that the most practical, to develop a naval version of the ATF. In other words, by the time you get all these other submissions in there, that program may have advanced so you will not be able to take advantage of what——

Mr. CANN. I am convinced that it will take through 1995 to do the demonstration/validation program. I do not believe there is a reasonable way to shorten that up.

Senator WALLOP. For the ATF?

Mr. CANN. No, for the A-X. But after that, the actual time to IOC, of course, is a figment of our paper imagination right now because these are all estimates on our part.

There are two advantages to what I am talking about. One is that if we have a successful demval, we might be able to shorten significantly the full scale development time. That is one.

Two, because we are not trying to integrate the avionics and the weapons systems in early—we are doing it during full scale development—we will be taking advantage of the most advanced technology, and by technology I mean the latest in electronic chips and so forth. So, we will not get ourselves in the usual position of trying to integrate electronics that were developed, say, in the 1980s into an aircraft that is not going to enter the fleet until the year 2000. We will be integrating into an aircraft we are going to IOC in the early 2000s equipment that is coming out in the late 1990s. I think that is a fundamental change in some of this philosophy.

Senator WALLOP. Yes, I would agree with that. I like the sound of it. It concerns me still that you do not have a mechanism really that puts the ATF in play with whatever other alternatives may be out there. It seems to me that we are now looking not only at the Navy, but at the whole defense acquisition budget, and the ability, if it will serve the purposes, to bring down unit cost both for the Navy and for the Air Force as it would seem to be a thing that we do not want to rule out of our spectrum of choice.

Mr. CANN. I hope to get a lot out of the ATF development in terms of avionics, the various weapons integration efforts, some of the commonality in jamming equipment, and so forth. But the ATF, which is a fighter airplane, is a fundamentally different airplane. It has supersonic capability, and the A-6 replacement or A-X as we envision it right now will be a significantly less robust airplane in that sense. It is going to take advantage of its ability to be stealthy. It is going to take advantage of its survivability attributes. Weight is a major issue because the ATF is an extremely heavy aircraft. If we were to go to an NATF version, we would have to do a tremendous amount of weight control and redesign to get that thing anywhere near to the point where we could fly it off and on a carrier.

Senator LEVIN. Senator McCain.

Senator MCCAIN. In other words, the ATF in its present condition is too heavy to be utilized by the Navy. Is that correct?

Mr. CANN. In its current form, yes.

Admiral DUNLEAVY. But, Senator, with the way we wrote the OR, industry has a wide range of options including a derivative of the ATF. It could be a player, but as it is structured right now—

Senator MCCAIN. One can only draw the conclusion then that the ATF was never envisioned for both services. Is that correct?

Mr. CANN. As I understand it, there definitely was an effort at attempting to build an ATF for the Air Force and have an NATF derivative for the Navy.

Senator MCCAIN. When they are designed for both services they always end up too heavy to land on an aircraft carrier. We either designed it for both services or we did not. If we did design it for both services, the question has to be asked, "why did it end up too heavy for an aircraft carrier?"

Can the F-14 carry out an attack mission?

Admiral DUNLEAVY. You mean as a replacement for the A-6?

Senator MCCAIN. Yes.

Admiral DUNLEAVY. No, sir.

Senator MCCAIN. Can the F-18 carry out a fighter mission on the level that an F-14 can?

Admiral DUNLEAVY. We saw the true multi-purpose capability of the F/A-18 demonstrated in Iraq combat while carrying four Mark 83s inbound to target. They saw two MiG 21s. The lead and his wingman had only been in the fleet 10 days. The young LT JG and the lead switched from air-to-mud to air-to-air. They shot down two MiG 21s, went back to air-to-ground, destroyed the target, and then returned to the carrier and got an OK3 wire. Yes, F/A-18s can do the fighter job. But with the F/A-18E/F and AAAM, it will improve the capability to fight and win at greater distances from the carrier.

Senator MCCAIN. The F-18 also cannot do the job that the A-6 was able to perform?

Admiral DUNLEAVY. The F/A-18E/F cannot do the long-range, all-weather attack mission currently performed by the A-6E.

Senator MCCAIN. So, the A-X is the only possible replacement for the A-6?

Admiral DUNLEAVY. Yes, sir. But once again, with the specifications as written, industry can come back with all kinds of different options on how to replace that A-6.

Senator MCCAIN. According to your testimony, the F-14 can have the capability of the F-15E with an upgrade. Is that correct?

Admiral DUNLEAVY. The F-15 Strike Eagle has the capability of doing some low level, all-weather missions as we know them but it does not have the long-range, all-weather strike capability we need to replace the A-6.

Senator MCCAIN. The problem, as I see it, gentlemen, is that we are going to see reductions in the defense budget increasingly reduce our options. If we bank on some future production of an aircraft and we do not know what the production costs are—initially I understand $4 billion to $6 billion for the F/A-18E/F—we could find ourselves in the most odious of situations. There may not be enough airplanes in the Navy to justify the existence of 12 aircraft carriers, or even 10. I hope you are factoring this into your calculations. If you are going to use a minimum of $4 billion to upgrade the F-18, how many billions of dollars are you going to have to spend on the A-X?

Mr. CANN. The projection that we currently have for the A-X is about a $11 billion program.

Senator MCCAIN. Well, I hope you are aware of the dangers that you are facing as you embark on this present course.

Mr. CANN. I think we are well aware.

Senator MCCAIN. What is wrong with just rewinging all of the A-6s?

Mr. CANN. We are planning to rewing A-6s——

Senator MCCAIN. Every one of them?

Mr. CANN. Right, every one that is capable of rewing.

Admiral DUNLEAVY. We are going to end up with 294 re-winged, composite wing, A-6s in the fleet through the year 2005. In addition to that, we are going to upgrade the A-6's reliability, maintainability, and also give it some computer upgrades. It will also be able to carry some stand-off weapons. However, when it comes down to the threat analysis, the A-6 will not be survivable beyond the year 2000.

Senator MCCAIN. What threat are you talking about, Admiral?

Admiral DUNLEAVY. Any threat outside the Soviet Union, including Syria with its formidable integrated air defense system. What we saw in Iraq, in the first couple of days, had the makings of one of the better integrated air defenses within the Middle East. And again, our fellows did a fantastic job, eliminating that system. However, I have an awful feeling that we may come away with the wrong lesson. Our adversary left town after about the third or fourth day, and, we may think that that is the way it is always going to be.

Admiral Stan Arthur, who is going to testify next week, I believe, stated the A-6 is the Spad of the 1990s. The Spad is out of date. It just does not have the ability to fight and win in a sophisticated and lethal integrated air defense.

Third World countries possess first world threats. We are asking young fellows to fly this aircraft against those modern threats. Commander Bob Besal, a skipper of VA-75, who led strikes from the Red Sea into the airfield just west of Baghdad, testified that we are really pushing the limits of prudence by exposing our aviators flying the A-6 in any kind of a high threat environment. And that is why we need the replacement.

Senator MCCAIN. Well, when you go about replacement, I will tell you again, my friend, you better be careful about how much money you spend on this upgrade. Otherwise, you are not going to have a replacement for the A-6. It is that simple when I look at the defense budget in the next 5 to 10 years. You better to be able to rely, at least to some degree, on your existing inventory to carry out these missions.

There has not been one aircraft program before this committee in the last 30 years that did not at least double in price—at least double in price—by the time it got to production. You better factor that in because if it does not double, it will be the first time in the history of our procurement of naval aircraft. I think the A-4 is the last time an airplane came in at the projected cost, which I think was sometime in the middle 1950s. This will be the subject of a lot of debate in the future both over where you live and here. I give you the severest warning not to plan on the present level of the defense budget when you make plans for an upgrade of the F-18.

Admiral DUNLEAVY. Senator, that is exactly the reason we are necking down. That is exactly the reason for reducing the model/aircraft types we have on our flight decks in order to make the savings required to remain within fiscal constraints. Yes, sir. We are concerned.

Senator MCCAIN. Thank you.

Senator LEVIN. Thank you, Senator McCain. On the cost issue, you started to give Senator Glenn some of the cost figures. For the F-14 you indicated that it would cost $56 million per plane, I believe, and that did not include certain items. What will be the comparable cost for your F-18 upgrade under your $4 billion program for each F-18E/F?

Mr. CANN. Subject to possible change, I believe that the comparable number is about $47 million.

Senator LEVIN. How much?

Mr. CANN. I believe it is $47 million.

Senator LEVIN. That is apples and apples?

Mr. CANN. That is what I am not sure about. I may have to clarify that for the record.

Senator LEVIN. Are you sure that it is less than the F-14 offer that we have gotten?

Mr. CANN. Yes, sir.

Senator LEVIN. And you are also saying that——

Mr. CANN. Oh, excuse me.

Senator LEVIN. I'm talking about fly-away costs. I am not talking about life cycle.

Mr. CANN. First of all, I need to clarify one point. The $56 million was for the F-14D as we know it. The number I gave you of $47 million was for the F-18E/F as we see it. The all-up cost for the F-18C/D that exists today is about $35 million.

Senator LEVIN. Let's try to get an apples and apples figure. I guess it was the Admiral who gave us these figures. You said that it is a lot cheaper life cycle to go with the F-18E/F than it is with the F-14.

Admiral DUNLEAVY. Cheaper than the F-14D Quick Strike, which is an apples and apples comparison.

Senator LEVIN. Give us the fly-away cost per plane, and then give us your operating costs.

Admiral DUNLEAVY. Yes, sir. Comparing the F/A-18E/F to the F-14D Quick Strike, the F/A-18E/F is 35 percent cheaper than the F-14D Quick Strike.

Senator LEVIN. Give us the dollars.

Admiral DUNLEAVY. The dollars are $33 million versus $44.5 million, F/A-18 and F-14 respectively. The F/A-18E/F results in a 25 percent savings in support costs. Again, over 20 years, that equates to $36.6 billion versus $45.9 billion over 20 years for the F-14. The F/A-18E/F is 37 percent cheaper to operate than the F-14. We base that on $1,920 per flight hour for the F/A-18 versus $2,623 per flight hour for the F-14D.

The upgraded Hornet requires 20 percent fewer personnel, a significant reduction that is going to become more and more critical as we go through this decade into the next century. To operate a 10-aircraft squadron of the F/A-18s requires 196 folks, maintenance types or white hats, versus 245 white hats for the F-14D.

Senator LEVIN. Aren't you counting that twice? Didn't you just give us the maintenance cost before?

Admiral DUNLEAVY. No. The operating cost and support costs are two distinct cost categories

Senator LEVIN. You have not counted the personnel before, okay.

Admiral DUNLEAVY. I just gave you personnel costs.

Senator LEVIN. What does that come to in dollars, that 20 percent fewer?

Admiral DUNLEAVY. I have not figured that up, sir.

Senator LEVIN. If you would put it all in dollars, it would be helpful.

Admiral DUNLEAVY. Yes, sir.

Senator LEVIN. Please give us that for the record. Please continue.

Admiral DUNLEAVY. The reliability of the F/A-18 over the F-14 from a warfighter perspective is really one of the driving factors. The mean time between failures right now today and for the foreseeable future with the F-14 is about a half an hour in comparison to 2 hours for the F/A-18. From a warfighter perspective—Senator Glenn, you will appreciate this—that is a significant difference. We have those results in the fleet today, F/A-18C/Ds versus F-14s A+s and F-14Ds. Also, 36 percent more maintenance is required on the F-14 as compared to the F/A-18.

Of course, we have already heard Mr. Cann say the F/A-18 is the safest aircraft we have in the fleet. It has a 67 percent lower attrition rate than the F-14 because of the way it was designed. Don't forget the F-14 was designed back in the 1960s while the F/A-18 was in the 1970s. The vulnerability area of the F/A-18 is 75 percent less than the F-14. In other words, the F/A-18 is more survivable. And that, from a warfighter perspective, is very, very critical.

Senator LEVIN. That cannot be quantified.

Admiral DUNLEAVY. No, I can't tell you in dollars.

Senator LEVIN. I understand, but some things, though, that you did mention can be quantified, and for the record, would you quantify those items? There was personnel plus the maintenance.

Admiral DUNLEAVY. Yes, sir.

Senator LEVIN. Please put that in dollars as well as percentages for us for the record.

Admiral DUNLEAVY. Yes, sir, will do.

Senator LEVIN. Thank you.

[The information follows:]

The personnel cost to operate a 10-aircraft F/A-18 squadron is $7.1 million per year versus $8.9 million per year for a 10-aircraft F-14 squadron, a difference of 20 percent.

Using fiscal year 1990s flying hour program actual maintenance costs per flight hour, the F/A-18 aircraft was $1,004 compared to $1,709 for F-14 aircraft, a difference of 41 percent. Those costs for both aircraft are funds for aviation depot level repairables (AVDLRs) and aviation fleet maintenance (AFM—CONSUMABLES) used in aircraft maintenance.

Senator LEVIN. On your acquisition plan for the A-X, you are going to have, you indicated, a flying prototype.

Mr. CANN. Yes, sir.

Senator LEVIN. But you are not going to have a competitive prototype. You are not going to have a fly-off. Can you tell us why it is that you are not planning a fly-off like the Air Force is planning with the ATF?

Mr. CANN. I think that flying prototypes and competitive prototypes are expensive. It would cost on the order of about $1.3 billion more to have a competition in the actual prototype. There are some

problems from a management point of view with trying to have a competitive fly-off.

First of all, if you tell two contractors that they are in competition with each other, you are then in a position where you take whatever they propose in the first place. You get into a little bit of a hands-off situation because you are sitting there wanting to coach both of them with what they ought to be doing because you see problems that they are having, but because of the competitive nature of the activity, you are precluded from doing that. So, one of the difficulties I have with competitive prototyping is that if the intent is to pick one or the other, you run the risk of not getting precisely what you want out of either one.

The other problem that has become evident to me in the last year or so that I have been back is in other places where we have competition and competitive prototyping, if you will, we are finding out that one of the contractors finishes where he is and is sitting waiting for the other contractor to catch up. One inevitably gets into some form of trouble—he has funding problems, technical problems. Then you are in a position of trying to decide how to make a decision without the benefit of completing the real competition. I have this problem in a couple of other areas.

Senator LEVIN. Just to wind up this subject very briefly, why is it that the ATF is going to have a fly-off, but you are not?

Mr. CANN. The ATF had a fly-off. As I understand it, they flew off flying prototypes.

Senator LEVIN. Why are the factors that you just mentioned applicable in the Air Force? That is my question.

Mr. CANN. Well my guess is that they had similar kinds of problems. I do not know what the real differences are in those two airplanes. If I took a close look at it, I might argue that it would have been better to have a single prototype.

Senator LEVIN. Thank you. Senator Wallop.

Senator WALLOP. Thank you, Mr. Chairman. I guess I still want to go back to Senator McCain's warning, which is quite real. And the argument here seems continually to pit the F/A-18 against the F-14, but whichever of those you pick, you have to be careful not to expend so much on that that you will never get to the A-X.

Admiral DUNLEAVY. We have structured the program to start procuring the aircraft in 1996, and IOC in the fleet in 1998. Then the A-X follow-on and we start in 2001 and 2002 and it arrives in the fleet in 2005. We have a program that can stay within fiscal constraints. That is what we are looking at. That is why we structured this program so tightly to meet the fiscal dilemmas we are going to be facing as a nation for the foreseeable future.

Senator WALLOP. It worries me that even there you will go so far with the F/A-18. The temptation is always to buy some little more capability because somebody has discovered or demonstrated some little more capability. And the richer that program gets, the less likely it is that you are going to be able to have the really modern aircraft that you are looking for, and you are going to be stuck with an interim capability.

Mr. CANN. I think there is an interesting issue here. I am very sensitive to what you say. I am certainly not going to sit here and try to prognosticate what is going to happen 5 years from now be-

cause I am sure I will not be here to take the "rap" in 5 years. But at least in starting this program off, we are going to try to put controls on this E/F program that preclude what I would call "requirements creep" that has been a problem in a number of programs. One of the ways which I intend to do that through my program executive officer is to put some real clamps in the design side of this on the weight growth. The thing that really makes airplanes expensive is adding new capability, and the way you add new capability is by adding weight to the airplane. So, we are going to really try to maintain in this case, unlike some other efforts we have had, a real clamp on the growth of the airplane through IOC so that there is growth out there in the future.

The F-18C/D, by the way, has actually been a very good aircraft because it was designed to have growth potential up through the year 1994, and it has. The problem we are faced with is that bringback weight for the F-18C/D is all used up, and after 1994 you cannot add a single thing to that airplane without an incredible cost. So, that is why we are trying to push on.

Now, one of the points I think that has not been made in this discussion about F-18s and F-14s is that we are taking an F-18 that was fundamentally a modern design. I was around in those days, and in the F-18 design, we spent a tremendous amount of time at the front end of that program. We spent over $1 billion trying to work reliability, maintainability, and accessibility into that aircraft, so that it would be a very maintainable and a good life cycle aircraft. We are going to carry that forward in the E/F. The F-14, which was designed in the 1960s, does not have that kind of capability, and it would take some major improvements and a significant amount of money to bring it up to that level of reliability and maintainability.

Senator WALLOP. Actually, I do not quarrel with that judgment. By the time you get to the A-X, you will be working with a half-century old airplane with the F-14. My concern is not this argument between the two of them, but the tendency we have always seen in the past is, as you call it, Secretary Cann, the requirements creep, and it goes in there and it gets more and more expensive and less and less—it takes from your ability to continue the development of the A-X. And that is what the warning is.

Mr. CANN. I agree with you completely. At least as long as I am here, my job is to make sure that that does not happen, and I will pledge to you for the first years of that program, it is not going to happen.

Admiral DUNLEAVY. And, Senator, I do not think you will see us on the requirements side trying to force the F/A-18E/F to be the replacement for the A-X or A-6, because it cannot physically do the job we require: the long-range, all-weather, survivable attack aircraft required in future combat situations. It just is not physically possible.

Senator WALLOP. I go back to express again my anxiety about the Navy having spent $142 million on the NATF, and now we find that it is going to be of no use to you. Admiral Dunleavy, in your written statement you make some mention of it, but what do you envision as the primary requirements which will be expected in the A-X? What is to keep us from having another $142 million just go

out to sea or an even greater amount of money as there will be here?

Admiral DUNLEAVY. Again, as we have rewritten the tentative operational requirement for the A-X, we are looking for a long-range, all-weather attack aircraft that is survivable in the year 2005 and beyond. It is going to be an aircraft that will probably last until 2050, the way we are currently building aircraft. So, it must be a survivable aircraft that can do the job across the threat spectrum.

We have worked on it hard. We have opened up the specs. We have revised the specs from the original A-12 requirement, such as internal carriage that Mr. Cann already mentioned. That will enable the size of the aircraft in comparison to the A-12 to be smaller. That is in the very low observable configuration. We are also reducing the low observable configuration below 17,000 pounds of carriage. So, we have reduced significantly the requirements from a warfighting ordnance carriage point of view. We are also reducing the range from the 785 miles in the A-12.

So, there have been tradeoffs. Under current fiscal constraints we are looking for something that can give us the warfighting capability that is survivable and yet within acceptable economic range. We are asking for a price tag, fly-away cost of somewhere between $60 million and $70 million. That is going to be a hard thing to drive to.

Senator WALLOP. In 1991 dollars?

Admiral DUNLEAVY. In 1991 dollars, yes, sir.

Senator WALLOP. Thank you, Mr. Chairman.

Senator LEVIN. Thank you, Senator Wallop. Senator Glenn.

Senator GLENN. Thank you, Mr. Chairman. Just as a comment here, not as a question, I think what you are running into is a lot of skepticism over here on this side of the river. We have had a whole series of disappointments out of the Pentagon. SDI started out big, going to do lots of things. We were supposed to develop lasers and particle beams, and they were going to come right along in development. And we are still waiting; now the best scientists say it may be another 15 or 20 years. We have gone through different programs on SDI so far—not really through them. Rather, we have had four different concepts of this thing called SDI.

Another example: the B-2 was kept black for a long time until it got into cost and program difficulties. It is now $1 billion a copy if you figure the total program cost. And I know part of those are sunk dollars already, but I do not think we can afford $1 billion for one of anything.

ATF is now $100 million a copy and going up, as we understand it. And we are going to build all this capability to get it out there to fire a missile to go out and do the job anyway, basically, and are going to pay upwards of $100 million per aircraft.

Then the A-12 program came apart—a major program disaster.

We have just been disappointed in program after program after program. So, you are sort of reaping some of the skeptical view that I think is very much present in the whole Congress. It is not just those of us here today that are critical about this thing. It is that many in Congress have a real lack of confidence in what you

can develop and what you cannot, and whether you can manage these programs or not, and really bring them in or not.

Let me turn to another aircraft here. This is not just a pet of mine. I believe that the Nation needs the airplane, and that is the V-22, the Osprey. The Department of Defense proposes that we buy new helicopters to replace the old ones that are basically worn out. And yet, we have a new tiltrotor capability, and it is not something that is on the drawing board. It is something that is out there with over 500 hours of flight time on it, all pretty well tested getting there, brought along very carefully. Basically, just a rough rule of thumb, it goes twice as far, twice as fast, and with a third more payload than a helicopter.

Admiral, you were using some examples out of the Persian Gulf. How the Army wouldn't have loved to have the V-22 when they made that 200-mile dash up there into Iraq. They could have done it at 300 knots instead of 130, and landed with more payload, more people, and congregated the people faster. This is a good example of what the V-22 could have done.

It has a great capability for rescue operations where you can get in twice as fast, and do the SAR mission. It is important that the V-22 can be flight ferried over there. It does not have to be loaded on a ship and then wait for 1½ months to get to the Persian Gulf. You can in-flight refuel and fly them over there immediately.

So, the V-22 has all of these advantages, and yet the Department of Defense is dead-set on going back to helicopters, I think because of obstinacy. Somebody made a bad decision and now they are not willing to say they were wrong. I do not think this occurred at Navy level, but I would appreciate your comments on this. I think it happened upstairs from you people, but nevertheless, the decision was made by someone.

Even Congress brought this aircraft along. We are on our 11th year now in supporting this. We diverted last year in legislation that some of the V-22 money would be used for limited production, but the Pentagon refused to do it. For heaven's sakes, the government is not even in control any more. The Secretary of Defense just says, "no, we are not going to do it. I don't care what you people say over there and what you have written into law, signed by the President." The Department of Defense still doesn't do it. I do not understand that. I guess I do understand it, but I do not like it. That is the problem.

And the main thing is not just an argument back and forth across the river. It is about combat capability; the V-22 can go twice as far, twice as fast, and with a third more payload, and yet the Department of Defense proposes to buy old-fashioned helicopters, for heaven's sakes, to replace existing ones when we have this new capability developed, and we have spent all this money on it over an 11-year period.

That is more a statement than a question, but would you comment on why on earth we are not going with the V-22?

Mr. CANN. I'll comment from the point of view of where we are in program because I have spent quite a bit of time reviewing where we stand today. We are going to spend money to complete the development program, as it currently exists.

We have an interesting problem with this program too. It is also overweight. In order to meet the actual operational requirement, there are some significant improvements that have to be made. One is in the gear box and in the rotor, and there are also some requirements to improve the aerodynamic qualities of the aircraft. The current program that we are trying to complete will certainly demonstrate all of the flight characteristics.

If you were to carry forward with the current aircraft, you would have to have a fundamental agreement to reduce the requirements. But from my point of view as the developer and procurer, there are no funds for us to continue the procurement program. I could not put it into procurement this year if I wanted to because it has not been through an operational test program. The current aircraft will not meet the operational requirements.

Senator GLENN. You mean the operational requirements are laid down. So, maybe it only goes 1½ times farther and faster and only a fourth more payload. That is still a monumental increase over what helicopters can do.

Mr. CANN. There is no question about that. One of the issues on that part of the subject is I have been in discussions with headquarters, Marine Corps, to get them to relook at their requirements issue to see what they would be willing to accept.

Senator GLENN. Well, let me say this. This committee and this Congress never looked at this in the narrow, narrow way that it was presented by the Pentagon because this aircraft was never looked at here as just a Marine ship-to-shore movement vehicle. Never was it looked at that way over here. And yet, because the Marine Corps wanted to carry it forward and thought it had a great potential, they were limited to what they could present as being only in their own interest, not for the overall good of the military and the country—that was what they were limited to by the Department of Defense—they were forced to put it on that basis. The Secretary says it is too expensive an aircraft to have for just a Marine Corps ship-to-shore movement that would get in there only 2 minutes ahead of what helicopters could do.

That is the most limited view of this airplane that I can possibly think of. If you think of every single function that a helicopter performs right now in the military, every function, not just ship-to-shore movement, but every function; anti-sub warfare search and rescue, special operations, battlefield mobility, and across the board, and then translate this over into civilian life for every function that helicopters perform, we figure that the way this new capability is developing, we have the potential to revolutionize vertical lift operations, both military and civilian. But because of the Department of Defense's myopic view that the V-22's mission is just from ship-to-shore for the Marine Corps that we are not going ahead with this thing, that, I think, is about as shortsighted as anything I can think of.

I agree that that is what the Marine Corps had to present because the Marine Corps had to stick to its own mission, not get over into somebody else's. But I can tell you that Congress' support for it, and my support for it, and my excitement about the airplane that just got the Collier Trophy this month as the biggest advance in aviation—are based on having it at our fingertips ready to be

built. The Japanese are interested; they already have been trying to work out agreements at Fort Worth to transfer some of the V-22 advances to their technology, which is a little different. So here we are. Unless we build the V-22 we are going to have to buy it back in a few years from the Japanese. Now, isn't that about the sum and substance of it?

Mr. CANN. As I understand it, the Secretary—[Laughter.]

Senator GLENN. The answer is yes. [Laughter.]

Mr. CANN. I pass. [Laughter.]

Senator GLENN. Well, I know the Navy was in favor of this program. I know it got upstairs from the Navy, and there were some decisions made that I think were very unfortunate. Now I think people are being stubborn and not willing to reevaluate this thing and look at it closely. Even though Congress funded the V-22 program, the Department of Defense says it will not spend the money we put in law for them to spend. Thank you. My time is more than up.

Senator LEVIN. Thank you, Senator Glenn. One of the concerns of this subcommittee is the industrial base which is left where we terminate existing production. Will we be able to produce cheaply those future planes or future vehicles or whatever? I discussed this with you, Admiral, in my office, and my question, though, here that I would like you to answer for the record is this: are we not, by terminating the F-14, going to lose part of our industrial base for Navy aviation, and isn't that going to raise the price of future planes because we will have less competitors? Or are there enough competitors left so that that is not a factor in your thinking?

Mr. CANN. I would like to answer that, Senator.

Senator LEVIN. Sure.

Mr. CANN. In the case of aircraft, unlike the shipbuilding business, I think that we have a more robust business base because we have commercial aviation that is being built. We have Boeing and Lockheed. We have McDonnell Douglas. We have Northrup. We have others. So, we have a number of people who can build aircraft.

The issue that we are faced with and one of the reasons for some of the decisions that have been made is that we need to get the efficiency of the aircraft lines that are being produced up to the point where we can manufacture less expensively. One of the difficulties is if we spread out the number of assets that we are going to build among too many people, we are going to find that we are not buying at an efficient rate from anybody, and the unit cost and the overhead of each goes up very high.

What I am concerned about at the present time is that with the decline in the budget—and we have had a major decline this year, about 22 percent of our budget from May to the time we finally submitted the fiscal year 1992 budget, and with the projections for the FYDP—we will not be able to support a large number of people. But there are at least five major airframe contractors. They are Lockheed, GD, Boeing, Mc Air, and Northrup without Grumman.

Now, I certainly do not encourage Grumman to get out of the business. They are still going to be doing E2C work and the EA-6B work and a number of other activities. And assuming we go ahead

with an A-X program, they will certainly be in a position to, if not go prime on it, certainly go as a major subcontractor to one of these other companies. So, I think that the base is still there.

Senator LEVIN. Go back to the question of the NATF, if you would, just for a minute. Your basic point here is that your A-X is going to have a different mission than the ATF and that you need more weight than the ATF.

Admiral DUNLEAVY. The other way around, less weight.

Senator LEVIN. You need less weight.

Mr. CANN. Less weight.

Senator LEVIN. Okay. Tell us why you cannot use a plane with less weight, less bombing capability therefore, but rely more on the Air Force for the heavy bombing. Why would it not make more sense to try to have that ATF and NATF again combined more and use, for instance, the B-52Gs, which are going to be dismantled apparently, for our long-range, conventional heavy bombing? The savings would be great if we could combine the ATF and the NATF. It would avoid some of the problems which we are very much concerned about here, which is that if you put $4 billion into the F-18, you might not have enough for your A-X. I was a little surprised when you said basically the NATF would not probably qualify to meet your A-X requirements because I thought it was going to----

Mr. CANN. The NATF was originally designed as a follow-on fighter aircraft.

Senator LEVIN. I understand. In any event, to get to a very specific question, why not have less payload in your A-X and consider at least using an NATF for that purpose with just a smaller payload and relying more heavily on the Air Force for the heavier bombing, using your A-X or NATF for knocking out your air defenses?

Mr. CANN. I have an answer to that, but I think that more properly Admiral Dunleavy would probably love to answer that question.

Admiral DUNLEAVY. Senator, we are always looking for a balanced air group; the ability to go to sea as a battle force commander or fleet commander, and to answer the mail, be it either presence or inflicting pain upon an adversary. With the flexibility of the carrier battle group, you have that capability to go out there and stay there for an indefinite period of time just within, say, 50 miles or 200 miles off the beach, and because of all your assets, you can give a measured response. You can just go up and fly around, or do lethal damage, or you can use—I hate to use the term "surgical strike," but a small strike, or you can go into a large strike because of the way we have designed our airwing. If we have to rely on long-range, land-based aircraft, you do not have the staying power. You can come over and make a run and many do a fantastic job of bombing, but you cannot stay there. You do not have the staying power of an offshore battle group.

Do we have the airfields around the world? Do we have overflight rights? These are questions that you should ask. But we have in the carrier battle groups deterrence through presence. They are there. They are there as long as you, Congress, and the national command authority wants to stay. So, we have this graduated re-

sponse option with carrier battle groups that is not provided with land based air.

We also have, indigenous to our battle group, the defense suppression capability. We go in and roll back. That is one of the best things our fellows did in Iraq. I think Admiral Arthur will tell you next week the defense SEAD, suppression of enemy air defenses, is one of the prime things our young fellows did.

Senator LEVIN. What is the difference in the payload between the NATF as originally conceived and your A-X?

Mr. CANN. I would have to supply that. I do not know with the NATF.

Admiral DUNLEAVY. I will answer that for the record later on because I do not have it off the top of my head.

[The information follows:]

The NATF's internal payload was 4 AAAM/AMRAAM, 2 AIM-9, and 500 RDS 20MM. No external load was mandated, but provisions for external carriage of weapons was desired.

[Deleted.]

Admiral DUNLEAVY. A derivative of the ATF could possibly answer the A-X OR. But right now, from everything we have seen, the ATF will come in somewhere between 86,000 and 90,000 pounds. That is too heavy and large for a carrier deck. It becomes unmanageable. We tried it back in the early 1950s with the A-3D. I was in the first squadron. A 76,000 to 80,000 pound aircraft, 12 of them, were just too large to operate and be able to generate the sorties required.

Senator LEVIN. Anything that is not too large would have a payload of what compared to what your A-X is going to have?

Mr. CANN. The NATF was going to have six air-to-air missiles.

Senator LEVIN. Period?

Mr. CANN. That's it.

Senator LEVIN. Plus what?

Mr. CANN. A total of a 4,000 pound payload.

Senator LEVIN. That is your total?

Mr. CANN. Yes.

Senator LEVIN. That is without the missiles.

Mr. CANN. That's total, including the missiles.

Senator LEVIN. Okay, it's a 4,000 pound payload. Now, what is your A-X going to have?

Admiral DUNLEAVY. We are asking for 4,000 plus pounds internal. That's our option.

Senator LEVIN. Give me an apples-and-apples comparison, if you would, between an ATF which you can fly off a carrier in terms of payload and an A-X.

Mr. CANN. We do not have it apples-to-apples because we do not have an NATF to fly off a carrier at this point. The NATF, because of its stealth characteristics, would have a 4,000 pound internal payload. We are talking about someplace between an internal payload for the A-X of 4,000 plus pounds depending on the size of the weapons, but probably doubles as max and what we are talking about in less stealthy configurations is half again as much.

Admiral DUNLEAVY. Senator, the horns of the dilemma we are confronted with are taking an air superiority designed aircraft, the

ATF, and making it into a long-range, all-weather survivable aircraft with some kind of stealth. It is very, very difficult.

Now, I am sensitive to the many potential advantages of the ATF variant which include commonality with the Air Force and a force multiplier capability in conjunction with the F/A-18E/F, primarily in the air superiority role. But the cons against the ATF as we know it now today are many unless we can reduce its basic weight. The aircraft as we see it and as we are hearing it, is basically between 86,000 and 90,000 pounds, and that is just too cotton-picking big to put on your carrier deck. And if we drive it too hard and say, okay, this must be the answer, then we are going to be forced into a shorter legged aircraft that cannot perform the long range mission with the stealth all-weather capability requirements. That is the dilemma we are facing.

So, again, if industry reads our operational requirement for the A-X, a derivative of the ATF could be the answer.

Senator LEVIN. The question is whether or not you ought to change your requirement around enough so we can build the darned thing. We may never get to an A-X.

Mr. CANN. Our requirement, the way we are laying it out, is going to afford the most flexibility. I hope it is going to also reduce the requirements to the point where you will be able to have the least costly approach to the A-X.

Admiral DUNLEAVY. One of the primary requirements in the design of the long-range, all-weather, survivable A-X is stealth. In the A-12, the operational requirement we dictated at that time was 360 degrees all spectrum stealth, VLO. We are saying in the operational requirement that we have re-examined the requirement for stealth. How much stealth do you really need? Are there other ways to make the aircraft survivable without 360 degrees all spectrum VLO? Can you do with less, but can it have the same survivability? And that should affect the cost and the size. So, again, as we closely re-examine the operational requirement, we have expanded the specifications. It is going to be a challenge for industry to answer. And hopefully, it will drive the cost down, drive the size down, and give us something we can use in the fleet.

Senator LEVIN. Thank you. Senator Wallop.

Senator WALLOP. What is the weight requirement of the A-X?

Admiral DUNLEAVY. Although the Secretary has not seen the TOR yet, we are asking for an A-X dry weight of no more than 43,000 pounds. That is dry weight.

Senator WALLOP. If you will forgive me, the NATF as you are saying is 86,000 pounds. What are you looking at as a comparative figure for the A-X?

Admiral DUNLEAVY. Something between 60,000 and 70,000 pounds, closer to 60,000 than 70,000.

Senator WALLOP. And the other thing, it seems to me you are looking at the NATF as simply a naval version of the ATF mission and all. One of the questions would be shouldn't you consider re-missionizing it and therefore changing a little bit the specifications of the airplane to meet the mission of the A-X?

Admiral DUNLEAVY. We, the operators, feel strongly we have to have a long-range, all-weather, survivable aircraft to replace the A-6. We are asking for some air-to-air capability to the A-X.

Again, we almost had it in the A–12; the ability to carry air-to-ground weapons and some air-to-air weapons for self-defense. However, that went away with the A–12. Now we are asking for a similar capability in the A–X at an affordable cost. Right now our priorities for this aircraft are among other things carrier suitability and affordability. Every tail-hook aircraft we buy has to be carrier suitable or it is useless. But the number two thing is affordability, and we are driving that hard and hope industry is listening. It must be affordable.

Senator WALLOP. I understand that and clearly nobody on this committee would argue with that. But one would begin to wonder if you do not develop some level of efficiency and affordability by building more of essentially the same thing using Air Force procurement as well as the naval procurement to drive the unit cost down.

Mr. CANN. Unfortunately, the Air Force design of the ATF did not take into account carrier landing and takeoff.

Senator WALLOP. But you spent $142 million trying to get them to take that into account. You are saying that nothing happened with that?

Mr. CANN. I cannot say that. I guess I would have to go back and look more carefully. But some studies were done to look at the applicability of the ATF to an NATF to the degree that I think we have an understanding of what it would take to take a derivative of that design and actually go into design. But I would say that the Air Force requirements tended to drive the design. There were a lot of Navy inputs to that design, and you could derive an NATF out of that, but it was a fighter aircraft. We are talking, hopefully, in the A–X about a subsonic aircraft that takes advantage of all of the survivability aspects and carries enough fuel to get you into the long-range strike mission.

The biggest place where I see commonality, which is not an insignificant amount of money, is going to be leverage off of the ATF avionics development. I think that we can save a huge amount of money in the A–X as we follow the Air Force in the avionics development process. I cannot give you actual numbers, but that is not an insignificant number, as you well know. We are talking about billions of dollars worth of avionics development and integration. That is the place where I think we are going to make a lot of money.

The airframe is going to be different. If we go with the plan we have right now, it would have different engines because we are not going to have to have the supersonic cruise and the other parts that are going to make it so different.

Senator WALLOP. Mr. Chairman, I only have two more questions. Admiral Dunleavy, Secretary Cann states that the F/A–18E/F will not be a replacement for the A–6. Do you share the view that this needed modernization will be envisioned as mostly an F/A–18C/D modernization program or more so as an interim A–X asset?

Admiral DUNLEAVY. Oh, no, sir. The F/A–18E/F will not replace the A–6. We see the F/A–18E/F as a quantum improvement over the F/A–18C/D, and it also ultimately will replace the F–14. As we draw down in inventory, our basic thrust is to have 60 fighter attack aircraft on our flight decks as well as E–2s, S–3s, EA–6Bs,

and helicopters. That number is going to vary from 20 F-14s and 20 F/A-18s and 16 to 20 A-6s. By year 2010, it should stabilize with 40 F/A-18E/Fs and 20 A-Xs. And the reason the F/A-18E/F cannot replace the A-6 is that requirement for increased range. We want about 700 miles, and the Hornet cannot provide the survivability and capability to do the all-weather, long-range strike mission.

Senator WALLOP. Let me move to AMRAAM for a moment, Admiral. How important is the continued procurement of the advanced medium range air-to-air missile in the Navy's modernization plan?

Admiral DUNLEAVY. Well, the AMRAAM will replace the Sparrow. We want to give the F/A-18C, the F-14D, and the F-14AT a multiple launch-and-leave capability and maneuver capability that is inherent in the AMRAAM. So, we are pushing on. We know it is clearly a significant advantage in countering currently fielded threat environment systems. So, yes, sir, we are totally supportive of the AMRAAM.

Senator WALLOP. Well, the answer really is very important then to the modernization.

Admiral DUNLEAVY. Oh, yes, sir, very, very important.

Senator WALLOP. And lastly, with the Phoenix program now coming to an end, does the advanced air-to-air missile remain the modern choice for complete air defense?

Admiral DUNLEAVY. The AAAM has come along to replace the Phoenix, because as the F-14s are rephased out, the Phoenix is unique to the F-14. We need the ability again to launch and leave, multi-spectrum, multi-faceted AAAM to go out and give, especially the F/A-18E/F, the long-range kill capability.

Senator WALLOP. And that is coming along satisfactorily?

Admiral DUNLEAVY. Yes, sir.

Senator WALLOP. Thank you, Mr. Chairman.

Senator LEVIN. Thank you, Senator Wallop. Let me ask just a couple of very precise questions on the A-X. What is your maximum weight that you assume your A-X is going to have?

Admiral DUNLEAVY. Maximum carriage capability or maximum weight of the aircraft?

Senator LEVIN. Weight of the aircraft.

Admiral DUNLEAVY. We do not know that yet, sir.

Senator LEVIN. Do you know approximately what it is?

Admiral DUNLEAVY. Somewhere between 60,000 and 70,000.

Senator LEVIN. It was what?

Admiral DUNLEAVY. Somewhere between 60,000 and 70,000. That is fully loaded. My personal opinion now, because I have not talked to Mr. Cann about this at all, is I would like to see a dry weight, in other words, everything except the fuel and bomb load and crew, of about 43,000 pounds.

Senator LEVIN. And fully loaded?

Admiral DUNLEAVY. Fully loaded I would like to see something about 60,000 to 70,000 pounds, closer to 60,000.

Senator LEVIN. That is fine. What is your minimum range that you expect that is going to be required?

Admiral DUNLEAVY. We want 650 plus miles, and that is in the high, low, low, high profile. That means a fellow goes out at a high

altitude, descends to 200 feet or below at about 100 miles from target, goes in, hits the target, and comes home.

Senator LEVIN. If 70,000 pounds is the maximum weight and 650 plus miles is your minimum range, what then would be your payload under those assumptions? Do you know?

Admiral DUNLEAVY. Again, we want somewhere over 4,000 pounds internal carriage on the very low observable criteria.

Senator LEVIN. Let me ask a question. Assume an ATF with 70,000 pounds fully loaded, 650 plus miles minimum range. What would be its payload roughly? Do you know?

Admiral DUNLEAVY. I have no idea, sir. I don't know.

Senator LEVIN. Would you be able to give us an approximate payload under those assumptions?

Mr. CANN. Their view is with those numbers it would be close to zero. Let us get you an answer for the record for that question.

Senator LEVIN. All right.

[The information follows:]

The Navalized ATF (NATF) was designed as a highly capable fighter (supercruise, high specific excess power, highly maneuverable). The strike role was secondary and the [deleted] NM HI-LO-LO-HI strike mission of the A-X was not a required mission for the NATF. Using the NATF requirements to design the aircraft, the zero fuel, zero stores weight was approximately 50,000 to 55,000 pounds. With a 70,000 pound maximum weight and utilizing the current A-X HI-LO-LO-HI mission ground-rules, the NATF would not attain [deleted] NM with zero payload. If the contractors were to optimize the airframe and engine to specifically meet the A-X mission the results might be different. This answer was based on the proposed NATF configurations submitted for the ATF/NATF source selection. The two configurations used airframes designed from the ground up for carrier operations.

Senator LEVIN. We will keep the record open for additional questions. Thank you both. You have been very helpful.

Admiral DUNLEAVY. May I make a comment?

Senator LEVIN. Yes, sure.

Admiral DUNLEAVY. Something I have not covered and may have been asked is if the Navy plan had been shoved down our throats by OSD. That is false. This is a Navy plan put together by the naval aviators with a lot of give and take and heated arguments on what is best for the naval aviation throughout the foreseeable future.

Senator WALLOP. Admiral, those Wyoming guys don't shove anything down people's throats. [Laughter.]

Admiral DUNLEAVY. Yes, sir. [Laughter.]

Senator LEVIN. There is a little nudge once in a while, but never a shove. [Laughter.]

Senator LEVIN. Thank you both. It has been very helpful.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR ALAN DIXON

F/A-18/F-14

Senator DIXON. Admiral Dunleavy, I understand the F/A-18 Hornet performed quite well in Operation Desert Storm, that it was a versatile, reliable, and highly effective war plane. I also understand the Navy is planning to upgrade aircraft to offset retirements of older aircraft. Based on performance in Operation Desert Storm, does it not make sense to upgrade the F/A-18 versus the F-14?

Admiral DUNLEAVY. The Navy is planning to upgrade the F/A-18 to provide increased range, payload, and performance over the models that will begin to retire during this decade. Although the F/A-18 performed superbly during Operation

Desert Storm, the decision to upgrade the F/A-18 was based on meeting Navy requirements for a strike-fighter with affordable cost and performance.

Senator DIXON. Admiral Dunleavy, the F/A-18 is capable of carrying nearly all types of Navy smart weapons. How much will it cost to give the F-14 a similar capability?

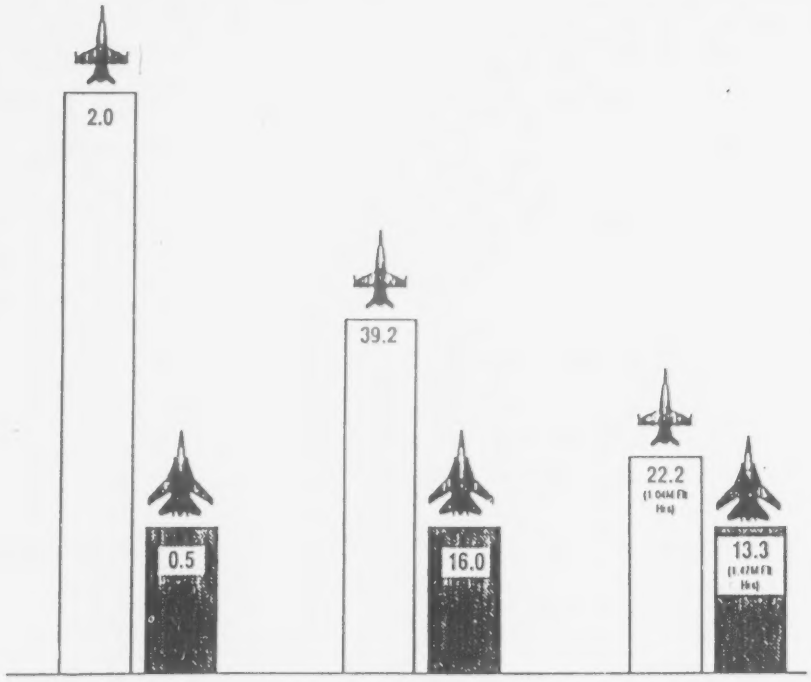
Admiral DUNLEAVY. The F-14D with Predeployment Update (PDU) will be cleared for the following smart weapons: MK-83/84 Laser Guided Bombs, HARM, Harpoon, and SLAM. Funding summary for the remainder of the PDU program is:

	Fiscal year		
	1992	1993	1994
Contracts	89.7	47.5	4.5
Weapons Integ	18.2	48.7	16.2
Misc	4.8	4.1	2.6
Total	112.7	100.3	23.3

Senator DIXON. Admiral Dunleavy, how does the F/A-18 compare to the F-14 in terms of reliability and maintainability?

Admiral DUNLEAVY. A comparison of F/A-18 reliability and maintainability with those of the F-14 is contained in the attached bargraphs.

Reliability, Maintainability, and Safety Comparison



Note : Data is averaged for all models

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

P-7 ALTERNATIVES

Senator THURMOND. Admiral Dunleavy, you mention on page 20 of your prepared statement that although the Navy had terminated the P-7 contract, the requirement for a P-3 follow-on aircraft remains. You also mention that you are currently exploring alternatives to satisfy this requirement. Can you tell us what alternatives are being explored and when can Congress expect to have a recommendation?

Admiral DUNLEAVY. The Navy is looking at tieing into the reopening of the Lockheed production line in Marietta, Georgia as a follow-on to the Korean purchase of P-3s. We are evaluating procurement of a minimally modified P-3C aircraft as a follow-on to Lockheed Korean deliveries in 1995, and are reviewing the increased range and operating cost benefits of incorporating a modern technology turboprop engine. This would save the Navy considerable money because the Koreans will have paid for all of the production line reopening cost.

COST OF CANCELED PROGRAMS

Senator THURMOND. Admiral Dunleavy, could you provide us how much total obligation authority the Navy has lost with the cancellation of the A-12 and the P-7 program? Is there any chance that the Navy can recover any of the funds?

Admiral DUNLEAVY. At the time of the A-12 cancellation and after deobligation of $2,195.6 million which reduced the level of contract obligations to the level of expenditures, $3.0 billion was obligated and expended. A demand letter has been issued to the contractor team for the return of funds in the amount of $1,352.4 million expended for work not accepted.

At the time of the P-7 cancellation and after deobligation of $81.0 million which reduced the level of contract obligations to the level of expenditures, $175.4 million was obligated and expended. A demand letter has been issued to the contractor for return of funds in the amount of $124.1 million expended for work not accepted.

MISSION CAPABLE RATE

Senator THURMOND. Admiral Dunleavy, your statement indicates that the mission capable rate goal for the Navy is 73 percent. I understand that for the last 3 years you have not met that goal and you don't expect to reach the goal in fiscal year 1992. Since funding appears to be the most critical factor, what increase in funding would you need to achieve the 73 percent goal? What has been the cumulative effect of the lower mission capable rate on crew morale and mission accomplishment?

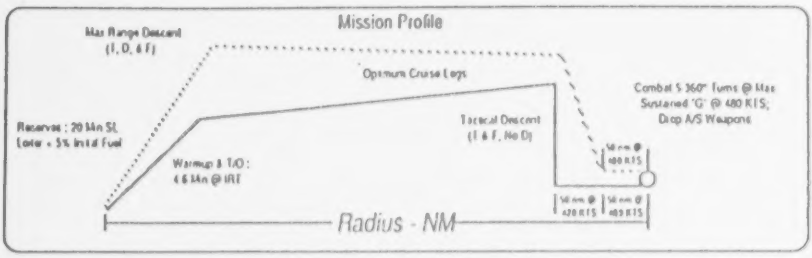
Admiral DUNLEAVY. The total force mission capable rate is 68 percent whereas the deployed force readiness is 77 percent. Notwithstanding, it has been my goal to reverse the overall decline in the mission capable rate. An estimated 2-3 percent of this decline was strictly due to a change in accounting procedures of aircraft in depot repair. A decline in mission capable rate was expected as a result of this procedural change and it has occurred. With the accounting change in mind, this leaves about a 2-3 percent real drop in the mission capable rate since the force goal was last achieved in 1988. The major factor during that period was reduced spare parts funding. Spare parts funding combined with depot aircraft and engine backlogs will continue to have a negative effect on total force rates in the future. Deployed mission capable rates will be maintained at goal at the expense of the total force. The funding increases to solve the total force shortfall in fiscal year 1992 are $347 million and in fiscal year 1993 $492 million. These areas are currently being addressed by the Navy for resolution. Concerning morale, the CINCs determine the distribution of spares and backlogs which has, thus far, negated any negative fleet impact.

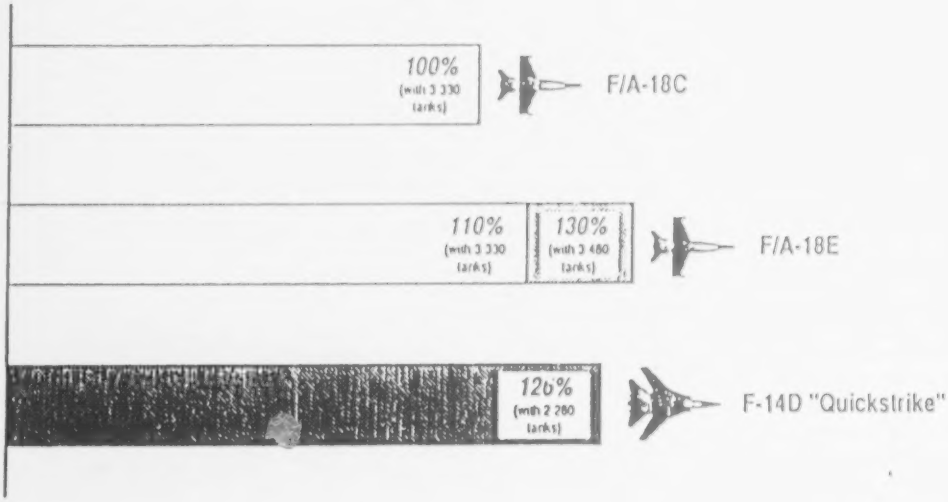
F-18 CAPABILITY

Senator THURMOND. Admiral Dunleavy, I have been told that even with a major modification effort of $4 to $5 billion, an upgraded F-18 would not have the range/payload/loiter-time capability of the existing and already paid for F-14D. Would you comment on that assertion?

Admiral DUNLEAVY. With upgrade of the F/A-18 to the F/A-18E model, its range/payload/loiter-time will generally exceed that of the F-14D. That is made clearer in the attached 5 pages of bargraphs.

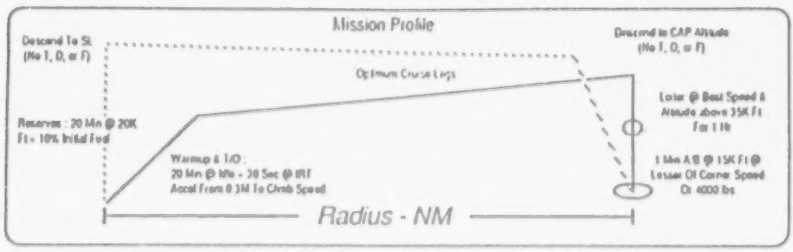
Strike Mission Radius Comparison

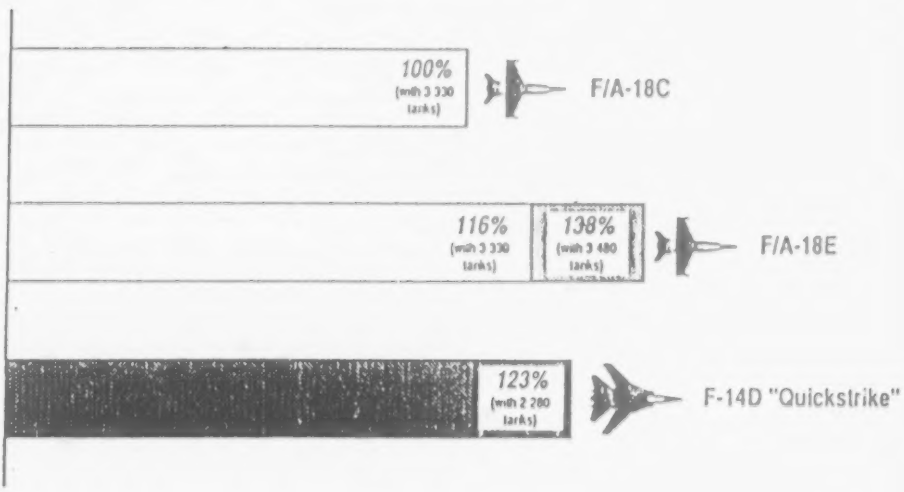




Mission Loadout
(4) MK-83 + (2) AIM-9 + Full 20mm Ammo + External Fuel Tanks Retained

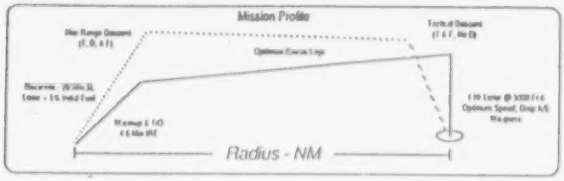
Combat Air Patrol Mission Radius Comparison

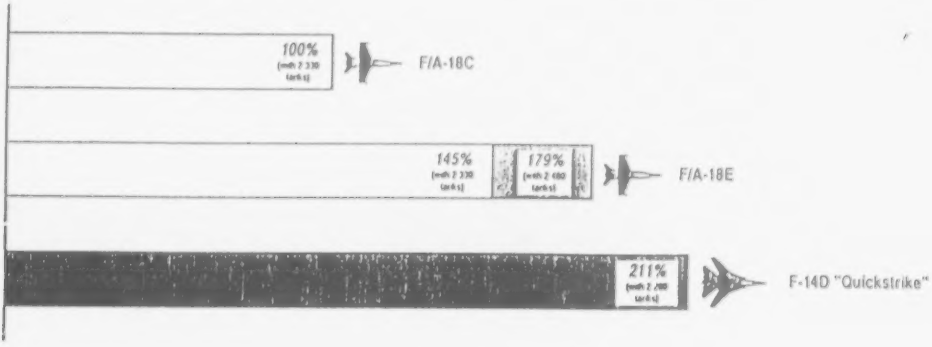

Mission Profile
Descend to SL
(No 1, D, or F)
Optimum Cruise Legs
Descend to CAP Altitude
(No 1, D, or F)
Reserves : 20 Min @ 20K
Ft + 10% Initial Fuel
Warmup & T/O :
20 Min @ Idle + 30 Sec @ IRT
Accel From 0.3M To Climb Speed
Loiter @ Best Speed &
Altitude Above 35K Ft
For 1 Hr
1 Min A/B @ 15K Ft @
Lesser Of Corner Speed
Or 4000 lbs
Radius - NM



Mission Loadout
(4) AMRAAM + (2) AIM-9 + Full 20mm Ammo + External Fuel Tanks Retained

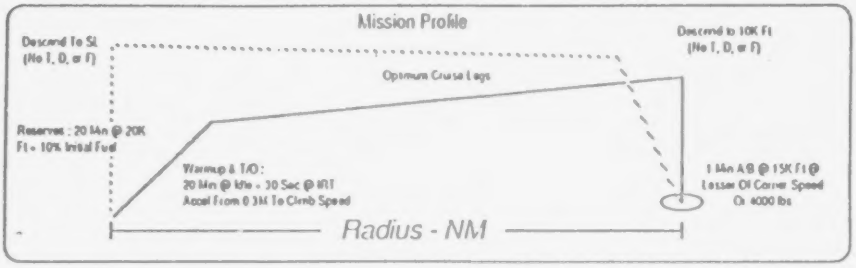
Close Air Support Mission Radius Comparison

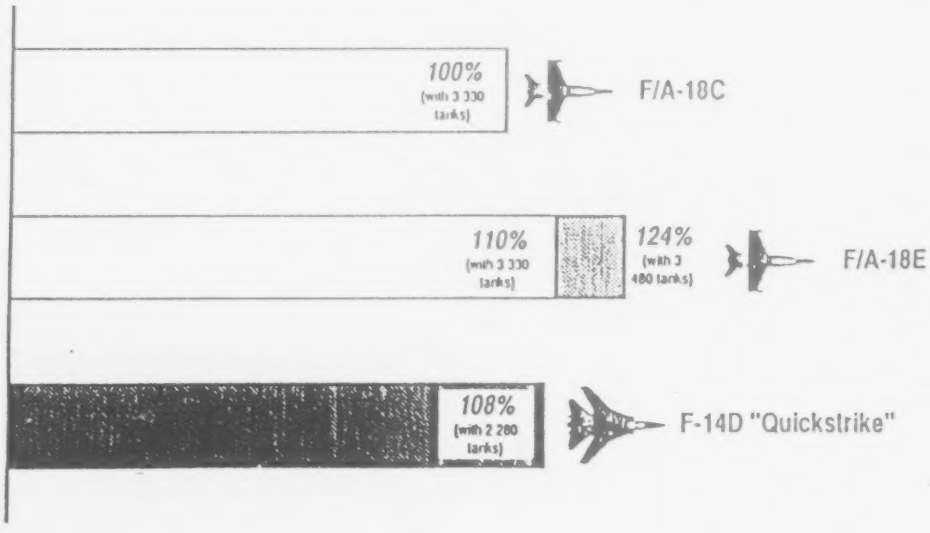




Mission Loadout
(6) MK 82SE + (2) AIM 9 + Full 20mm Ammo + External Fuel Tanks Retained

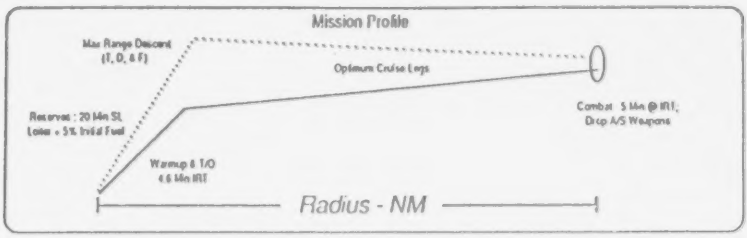
Fighter Escort Mission Radius Comparison

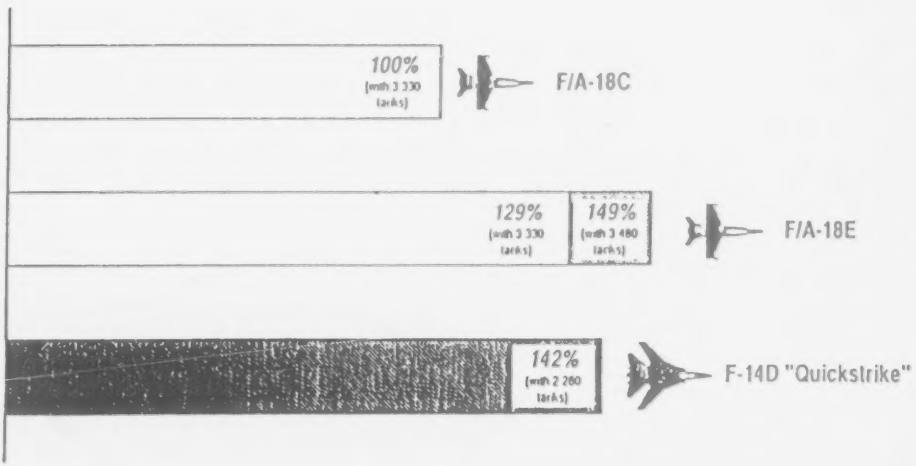

Mission Profile
Descend To SL
(No T, D, or F)
Optimum Cruise Legs
Descend to 10K Ft
(No T, D, or F)
Reserves : 20 Min @ 20K
Ft + 10% Initial Fuel
Warmup & T/O :
20 Min @ Idle + 30 Sec @ MIL
Accel From 0.3M To Climb Speed
1 Min A/B @ 15K Ft @
Lesser Of Corner Speed
Or 4000 lbs
Radius - NM



Mission Loadout
(4) AMRAAM + (2) AIM-9 + Full 20mm Ammo + External Fuel Tanks Retained

Anti-Surface Warfare Mission Radius Comparison


Mission Profile
Max Range Descent (1, D, & F)
Optimum Cruise Legs
Reserves : 20 Min SL Loiter + 5% Initial Fuel
Combat 5 Min @ INT; Drop A/S Weapons
Warmup & T/O 4.6 Min INT
Radius - NM



Mission Loadout
(2) HARM + (2) Harpoon + (2) AIM-9 + Full 20mm Ammo + External Fuel Tanks Retained

A-12 TERMINATION

Senator THURMOND. Secretary Cann, what technology—if any—from the canceled A-12 program can the Navy salvage and apply to existing programs?

Mr. CANN. The Navy has already assembled a database of technical reports and other information on items such as:

— composite materials,
— stealth technologies,
— avionics,
— advanced structures,
— aerodynamics of advanced shapes, and
— flight controls.

This information may be applied to other programs. Precisely how this information will be exploited and the extent to which it is usable is not yet clear for a variety of reasons including the impending litigation (as of May 7) with McDonnell Douglas and General Dynamics.

NAVY AVIATION BUDGET

Senator THURMOND. Admiral Dunleavy, with the severe problems facing naval aviation, why is the Navy allocating only 6.7 percent of the Navy's budget for aviation? I understand that this figure is the lowest in more than 22 years.

Admiral DUNLEAVY. Based upon the fiscal years 1992–1993 Amended Budget Submission, the Aircraft Procurement Navy (APN) appropriation comprises 7.7 percent

of the Department of the Navy's Total Obligational Authority. This portion is, in fact, the lowest percentage in well over 22 years.

In the last 2 years, Naval aviation has experienced severe acquisition turbulence which has resulted in the cancellation of six major aircraft procurement programs including A-12, V-22, ATS, P-7, F-14D (New) and F-14D (Remanufacture). These terminated programs are the primary reason for Naval aviation's current modest level of funding.

MARINE AVIATION

Senator THURMOND. Admiral Dunleavy, I am told that the main limitation to land-based Marine aviation during Operation Desert Storm was the small number of night-fighting and all weather aircraft which made it difficult to keep the pressure on the Iraqis around the clock. What are the Navy's plans to upgrade the Marine's capabilities in these areas?

Admiral DUNLEAVY. The Navy is proposing fixed wing improvements and a comprehensive Marine helicopter enhancements package that will significantly improve Marine aviation's night-fighting capabilities as follows:

Fixed Wing:

AV-8B night attack aircraft deliveries will continue through 1993 outfitting two of the Marine Corps' eight Harrier squadrons.

F/A-18C night attack aircraft along with the two-seat F/A-18D version will continue to improve Navy and Marine Corps night-fighting capabilities. However, incorporation of an all-weather attack capability in the F/A-18D is unfunded.

Rotary Wing:

Rotary wing night-fighting enhancements are centered around the Aviation Combat Element (ACE) portion of Special Operations Capable (SOC) Marine Expeditionary Units (MEU). This comprehensive package incorporates urgently needed night upgrades to our helicopter fleet providing a balanced warfighting capability.

The AH-1W Night Targeting System (NTS) will provide the Marine Corps with an autonomous TOW/Hellfire, fully night capable attack helicopter.

The UH-1N has received supplemental Desert Storm funding to procure basic FLIR systems over the next 2 years. The funding will allow for the initial outfitting of airframes with a basic navigation ability. However, Desert Storm fighting where the UH-1 used prototype LASER/FLIRs highlighted its need to also have LASER designators to obtain pin-point destruction of enemy forces and equipment.

The CH-53E Helo Night Vision System (HNVS) will incorporate the AAQ-16 FLIR that will improve navigation during night and inclement weather.

All helicopters will complete the installation of night vision goggle (NVG) compatible cockpits in the next several years. In addition, procurement of NVG compatible exterior position and anti-collision lights is a high priority.

The procurement and installation of NVG Heads-Up Displays (HUDs) will provide pilots with vital aircraft performance and navigation information on their ANVIS-6 NVGs. These devices will greatly reduce pilot workload and improve the safety margin at night.

All helicopters are scheduled to receive AN/APN-217 Doppler Navigation System and the Global Positioning System (GPS) which will vastly improve our ability to navigate, especially at night.

Finally, the installation of the AN/ARC-210 UHF/VHF Havequick/Sincgars frequency hopping radio will provide Marine aviation with full USAF interoperable, anti-jam communications capability.

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

NAVAL AIR

Senator MCCAIN. Mr. Cann, what steps have you taken to ensure that the program costs for the F-18E/F you present are realistic and that this program is really affordable?

Mr. CANN. At this point our cost estimates on the F/A-18E/F program should be viewed as preliminary estimates. However, I can assure you that we are doing everything possible to ensure that we start this program with realistic estimates of the costs involved. We have over 15 years of estimating experience on F/A-18 production and the design and development of modifications to the aircraft. Much is known about the F/A-18 materials, components, subsystems, and manufacturing processes and much of this will carry over directly to the F/A-18E/F. We will

ensure that this experience and knowledge is brought to bear as we continue to refine our cost estimates for development and production.

Upgrades to the F/A-18 have been considered, studied, and priced for the past several years. Major areas of risk have been identified and we will ensure that these risks are properly accounted for in our cost estimates. We should have a good handle on the costs even before we receive the formal proposal from the contractor. Once we do have his quote, however, we will analyze it in detail, compare it with the Navy generated estimate, and reconcile any differences. This should result in the most realistic estimate possible when we enter engineering and manufacturing development.

Affordability has been a key factor in the restructure of the Navy's aviation modernization plan and F/A-18E/F has been selected as the most cost effective alternative available to replace the F/A-18C/D and the F-14 aircraft. Its development has been timed to avoid significant overlap with the engineering and manufacturing development effort.

Senator McCAIN. Mr. Cann, the F-18E/F program all hinges on the availability of the A-X at the time and cost required. What steps have you taken to ensure that these costs and schedules are realistic?

Mr. CANN. The F/A-18E/F program does not hinge on the availability of the A-X. The F/A-18E/F development and production precede similar phases of the A-X program by about 5 years. This time phasing of the two programs is important from an affordability standpoint. The peak funding years for the F/A-18E/F will occur before the A-X engineering and manufacturing development phase begins. Likewise the F/A-18E/F will be in stable full rate production before initial production of the A-X. The Navy is doing everything possible to ensure that costs and schedules of both these programs are well understood and realistic.

Senator McCAIN. Admiral Dunleavy, what will you do if the A-X should slip by 5 to 7 years or escalate sharply in cost?

Admiral DUNLEAVY. A slippage of that magnitude would not be acceptable. It is our intention from the outset of the A-X program to closely monitor industry progress on the program and to apply the lessons we learned from the A-12 program to prevent such a slippage from occurring. The primary advantage we'll have over the A-12 program is that the A-X program will be mostly "white" with only that information that must be protected classified "in the black." This will allow open oversight of the program from the beginning. It is also our intention from the outset to try and minimize the technical risk as much as possible while still providing the next generation strike aircraft that we need. As far as cost, the contract for the program will stipulate cost limits and if there is a sharp escalation of costs beyond contract allowances the Navy will promptly inform Congress.

Senator McCAIN. Mr. Cann, what assurances can you give this committee on the development and procurement costs of the F-18E/F?

Mr. CANN. At this point our cost estimates on the F/A-18/F program should be viewed as preliminary estimates. However, as previously discussed, we are doing everything we can to ensure that we start this program with realistic cost estimates. In addition, we are taking the following actions to understand and track cost once we are on contract: a. Establish timely and interactive cost tracking systems between the contractor and program office; b. Ensure that all critical members of the program management team have been trained on the latest cost tracking techniques; and c. Establish a baselined scheduling and variance management tracking system to monitor programs progress. It is our intent that by establishing these management systems and holding the program manager and program executive officer accountable, we will have the necessary insight to manage the program and to keep everyone informed on the development and procurement costs as we proceed.

Senator McCAIN. Mr. Cann, what penalties will the contractor agree to, to ensure that cost and schedule are met?

Mr. CANN. The contractor will be incentivized to meet cost and schedule by fee adjustment provisions we plan to include in the cost type contract. The amount of fee earned by the contractor will be tied to how well he performs relative to cost, schedule, and other important program parameters.

Senator McCAIN. Admiral Dunleavy, will you explain the precise reasons for canceling remanufacture of the F-14?

Admiral DUNLEAVY. The decision to terminate the F-14D remanufacturing program was made primarily on affordability grounds. This program would have required $14.8 billion in funding over the fiscal years 1991-1997 period. Even if fully executed, the program would have resulted in fewer than 150 F-14D aircraft by fiscal year 2000. Most of the fleet would still operate the older, non-upgraded F-14A/A+s.

Senator McCAIN. Admiral Dunleavy, the main arguments raised against the F-14D Quick Strike are that:

- it will be too expensive to support two types of aircraft and there will be too few F-14Ds;
- it is much more expensive in manpower and O&M;
- it is not survivable over the beach; and
- it is not as flexible in terms of attack munitions.

Would you explain the Navy's reasoning on each of these issues in more depth and provide a detailed statement of the Navy's position for the record?

Admiral DUNLEAVY. Given the current budget realities, a lessening of the global threat and accepting a higher degree of risk, it is possible to significantly reduce the cost of the airwing by making larger buys of a single type of aircraft (F/A-18E/F) and achieving more efficient production rates. At the heart of the F-14D "Quick Strike" (QS) versus F/A-18E/F issue is affordability. The F/A-18E/F is projected to be 25 percent less expensive to operate and support over a 20-year service life and reduces the required personnel by approximately 20 percent to operate and maintain a 10-aircraft squadron than the F-14D (QS). The F/A-18 had survivability designed into the basic aircraft. The original F/A-18 design is less vulnerable than the F-14 because of system redundancy and technological advances such as quad redundant flight controls, explosive and fire suppression void filler foam, and dispersed avionics with multiple backups and degraded modes. The F-14D (QS) could incorporate some of these features such as explosive and fire suppression foam fillers, onboard inert gas generators, and self sealing fuel tanks. The F-14 is a much larger target, more easily acquired visually, on radar, and on infrared or electro-optical sensors. The follow-on F/A-18 series benefits from its original survivability improvements. In terms of flexibility, the F/A-18E/F would benefit from previous F/A-18C/D integration and be cleared for the majority of the USN/USMC inventory of weapons. The F-14D (QS) would build on a more modest capability developed for the F-14D pre-deployment upgrade.

Senator McCAIN. Admiral Dunleavy, what will happen if the A-X is canceled and no further F-14 production capability exists?

Admiral DUNLEAVY. If the A-X were canceled and no further F-14 production capability existed, carrier air wings would have to be built around F/A-18 aircraft. F/A-18E/F variants will provide capabilities exceeding those of the F-14 but, as A-6s and F-14s depart the inventory early next century, F/A-18 procurement would have to be increased to fill our carrier decks. Even so, F/A-18s would be unable to provide the all-weather stealth capabilities A-X will give the fleet.

Senator McCAIN. Admiral Dunleavy, what is the current status of Navy special purpose aircraft modernization and what is the status of the P-7 replacement?

Admiral DUNLEAVY. The S-3A to S-3B Weapon System Improvement Program (WSIP) is progressing on schedule. Through fiscal year 1991, 113 of 121 planned conversion kits have been procured. The remaining eight conversion kits will be procured in fiscal year 1992. To date, seven fleet squadrons and one fleet readiness squadron have transitioned to S-3B configuration. Community transition will be complete in fiscal year 1994. Twenty three aircraft will remain in S-3A configuration and be stored to conserve service life as a hedge against future attrition or surge requirements.

SH-3 helicopters are in the final phases of upgrading the airframe to SLEP configuration. As these aircraft are replaced by the SH-60F CV helicopter, the SH-3s will be utilized to fulfill non-CV logistics helicopter requirements. The SH-60F commenced replacing the SH-3 in 1990 and the 11 active/2 reserve airwings will complete transition in 1998. The SH-60F is SH-60B LAMPS derivative that provides the increased ASW capability and savings in commonality and increased readiness and maintainability. Additionally, two HH-60H strike rescue/special warfare aircraft are assigned to the HS squadron. This provides the CVBG an organic night medium threat strike rescue aircraft. The aircraft is fully night vision goggle capable and has enhanced self defense weapons and survivability sensors/countermeasures.

The E-2C continues in production with the last buy in fiscal year 1993. Our retrofit program will begin in fiscal year 1993 with a plan to retrofit the Group II (APS-145) system into 54 older E-2C aircraft. Twenty nine of these retrofits are funded within the FYDP. This should bring us to a total Group II force soon after the year 2000. The Group II system includes extended range radar and IFF, enhanced central computer, GPS, and provisions for Joint Tactical Information Distribution System (JTIDS).

The EA-6B Advanced Capability (ADVCAP) remanufacture program is scheduled to commence in fiscal year 1993. All EA-6Bs are scheduled to be remanufactured.

This capability upgrade will allow EA-6Bs to counter the projected threat beyond the year 2000.

As a result of the cancellation of the P-7 program, the Navy is considering tying into the reopening of the Lockheed P-3 production line in Marietta, Georgia, as a follow-on to the Republic of Korea's purchase of eight P-3s. We are evaluating a program, structured around the reopening of the Lockheed production line, to procure a minimally modified P-3C as a follow-on to the Korean deliveries in 1995. We are also reviewing the increased range and operating cost benefits of incorporating a modern technology turboprop engine. This would save the Navy considerable money because the Koreans will pay the cost of reopening the production line.

Senator McCAIN. Admiral Dunleavy, what is the current status of the A-6 fleet and what is being done to ensure it will remain flyable?

Admiral DUNLEAVY. To ensure its flyability, the Navy is currently replacing 294 high time A-6 wings with a composite wing. The Navy is also upgrading 230 A-6s with the Block-1A/NVG upgrade program to enhance the mission effectiveness of the A-6. This upgrade program will greatly enhance the A-6's survivability through this decade. The Navy is also investigating further upgrade programs to extend the viability of the A-6 until it is replaced by the A-X.

Senator McCAIN. Mr. Cann, what risk analysis have you made of cost growth in the A-X and F-18E/F programs? Please provide full details and list and explain all such estimates.

Mr. CANN. We are in the process of doing the kind of analysis you refer to. For the F/A-18E/F it will be complete this fall to support the milestone review of the program by the Defense Acquisition Board. For the A-X we are in the very early stages of cost estimating. Preliminary estimates have been developed for a notional A-X program. These estimates and the associated risk analysis will be continually refined as we proceed through the concept exploration and demonstration/validation phases of the program.

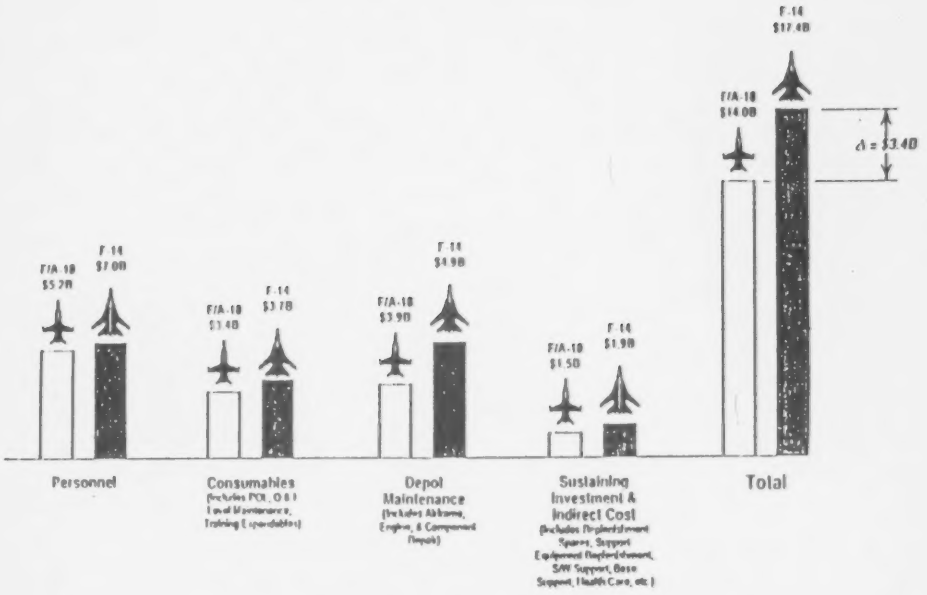
Senator McCAIN. Mr. Cann, what cost growth could we expect if the cost of the A-X and F-18E/F escalate to the same extent as other recent programs did at this stage of their development?

Mr. CANN. Obviously our goal is to avoid the cost growth experienced by other recent programs. We are doing everything we can to ensure that we begin these programs with realistic cost estimates that properly reflect the technical risks involved. We will establish management tracking systems that will provide the level of detail needed by the Navy and contractor program manager to keep the programs on course. We will incentivize the contract fee arrangements.

For both programs we are identifying the risk areas and taking action to reduce the risks that could lead to cost growth. The A-X program will include a significant risk reduction effort during dem/val including effort in materials characterization, structural "building blocks" and key tooling validation, as well as building two flying prototypes prior to entering the engineering and manufacturing development phase. All of these things will help us manage these programs to avoid cost growth.

Senator McCAIN. Admiral Dunleavy, please provide a full break-out of the $9.3 billion difference between the cost of a F-18E/F force and an F-14 Quick Strike force.

Admiral DUNLEAVY. Our original (preliminary) estimate of the difference in 20-year operating costs between the F/A-18 force and the F-14 force was $9.3 billion (the F-14 being 25 percent more costly). Our most recent and much more detailed estimate shows a difference of $6.8 billion (the F-14 being 23 percent more costly). The breakout of the $6.8 billion difference is provided on the attached bargraph.



[Whereupon, at 4:58 p.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1992 AND 1993

FRIDAY, MAY 10, 1991

U.S. SENATE,
SUBCOMMITTEE ON CONVENTIONAL FORCES
AND ALLIANCE DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

ARMY ACQUISITION PLANS AND MODERNIZATION REQUIREMENTS

The subcommittee met, pursuant to notice, at 9:06 a.m., in room SR-222, Russell Senate Office Building, Senator Carl Levin (chairman of the subcommittee) presiding.

Committee members present: Senators Levin, Shelby, and Wallop.

Committee staff members present: John N. McConnell, system manager; and Daniel G. Sakura, research assistant.

Professional staff members present: John J. Hamre and Michael J. McCord.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; George W. Lauffer and Durwood W. Ringo, Jr., professional staff members.

Staff assistants present: Barbara Gallo, Lisa H. Kettlewell, Cindy Pearson, and Mickie Jan Wise.

Committee members' assistants present: Terence M. Lynch, assistant to Senator Shelby; and Eric H. Thoemmes, assistant to Senator Coats.

OPENING STATEMENT OF SENATOR CARL LEVIN, CHAIRMAN

Senator LEVIN. This morning the Subcommittee on Conventional Forces and Alliance Defense continues our hearings on the fiscal years 1992/1993 budget request. When we started our hearings this year, I noted that this year's budget request has a couple of very clear themes. Most of the major acquisition programs that have been the backbone of conventional force modernization during the 1980s are being terminated. This is especially the case for the Army. Each of the so-called Big Five modernization programs—the AH-64 helicopter, the MLRS rocket system, the M1 tank, the M2 fighting vehicle, and the Patriot air defense system—are being terminated.

In the case of the MLRS rocket system, the rocket production program is being terminated, and there are questions about the ongoing viability of the launcher production line. These are precisely the kinds of systems that made such a difference in ground combat operations in Operation Desert Storm, as we just heard yesterday, when General McCaffrey and other officers from the 24th testified on their role in Operation Desert Storm.

At the same time that these programs are being ended, the Army is pressing ahead with plans to build new technology replacements for some of these systems all the way from the LH helicopter program to the armored systems modernization program. These new weapons systems will not be available, however, until the next decade.

In many instances we are not just losing production lines, we are losing industries. If these programs are terminated, we may find that it takes years to rebuild the industry that we are terminating, and we will find a big price tag on any rebuilding from scratch.

This year's JCS joint military net assessment contains some troubling observations concerning the industrial base, and I quote: "The United States presently has a significant industrial base potential for force reconstitution. However, there are concerns about the continued vitality and responsiveness of our resource base and the ability to compete with foreign countries. Defense contractors will likely downsize, diversify, be purchased by foreign firms, or cease operation, virtually eliminating timely expansion capacity. Because of commercial demands, the missile electronics and aircraft industries, while reduced in size, will continue to maintain a supply base and production capability. In the future, the number of major contractors for shipbuilding, nuclear power and propulsion units, and combat vehicles may shrink to unacceptably low levels."

As I said at our first hearing, I do not have an easy answer for any, much less for all, of these problems. We may not be able to solve them. But this clearly represents the primary challenge that we face this year as we review the budget request and the associated Future Year Defense Program.

We have two distinguished witnesses to help us review this situation. Mr. Stephen Conver is the assistant Secretary of the Army for Research, Development, and Acquisition, and in that capacity he is the Army's acquisition executive.

He is accompanied today by Major General Richard Beltson, who is the Deputy for Systems Management in Mr. Conver's organization. We are very pleased to have you with us today even though we are troubled by the subject matter and by the message which you may be bringing us.

Before we proceed with our first panel, let me call on my colleague, Senator Wallop, to see if he has any opening remarks.

Senator WALLOP. Thank you, Mr. Chairman, and let me add my welcome to the Secretary and to General Beltson. I appreciate your scheduling this hearing, not necessarily this morning with spring out and Friday with the Senate out, but it is an important hearing, and I jest. We need it.

I think there is no one who is not proud of the Army's extraordinary performance in Operation Desert Shield and Operation Desert Storm. The soldiers and the equipment performed extremely well.

The trip I made to Kuwait and Iraq in mid March to visit the combat units there was both interesting and gratifying to see the results of the outstanding performance of soldiers and their equipment.

The American people through their willingness to invest in modern high performance weapons not only assured our victory over there but, in my opinion, preserved the lives of our troops, the most precious and valuable assets. I also believe they saved economic resources by virtue of their effect and their power and swiftness.

More important, I think the observation is that the Army—and I say this with some regret because the only part of my military career was in the Army—has been a sort of stepchild. It has not been the sexy service in the recent decade or so. So I have to say hats off for the extraordinarily efficient way in which most of the resources that you did gather up were applied to things that made a real difference.

So we have now the harsh economic realities, and I believe that the country must provide the funds needed to continue modernizing the armed forces. I believe that we have to maintain the technological edge that gives us an advantage over adversaries and must be willing to afford increasingly high costs of procuring those weapons systems. I think we also have to realize that as the force structure shrinks, the unit cost will rise. The unit cost is not going to be an adequate measurement of the effectiveness of the expenditures of defense dollars.

I hope that Congress will not forget the benefits of maintaining the high quality, well-trained, well-led forces equipped with the best equipment this Nation can design and produce. We had a graphic demonstration of its value.

I am aware that there are many who are already looking to the ever-shrinking defense budget as a resource to expand domestic programs. I hope that Charles Wolf, Jr., Mr. Chairman, was not right when he said that those who do not study the past will repeat its errors; those who do study it will find other ways to err. [Laughter.]

With that, I would welcome the witnesses this morning.

Senator LEVIN. Thank you. As an old artilleryman, you know this subject very well. Your point about the Army in general is well-taken. This subcommittee has tried during the 1980s to make up for what is sometimes called the lack of glamour in some of the Army programs, because they are vital, basic programs. We have done our best. We are proud of some of the successes during the 1980s that we have had in maintaining modernization for the Army, and it showed, as you said, during Operation Desert Storm. So I join you in those remarks and those comments.

At this time I ask that Senator Thurmond's opening statement be entered into the record.

[The prepared statement of Senator Thurmond follows:]

PREPARED STATEMENT BY SENATOR STROM THURMOND

Thank you, Mr. Chairman: I want to join you in welcoming Secretary Conver and General Beltson. They are appearing before the subcommittee at a time when the Army is enjoying the successes of Operation Desert Storm and the superb perform-

ance of the weapons systems that their predecessors, Dr. Scully and General Pihl, and this subcommittee worked so hard to acquire.

Mr. Chairman, despite the successes of the M1 tanks, the Bradley Fighting Vehicle, and the Apache helicopter, the Army must continue to look toward the future. As the defense budget shrinks and the size of the Army is reduced, we cannot allow its capability to meet the challenges of the new era deteriorate. We must never again make the mistake we made in the early 1970s when our forces looked good on paper but in fact were hollow in terms of manpower and fighting capability.

Mr. Chairman, the weapon systems that gave us the victory in the Persian Gulf were the result of a robust research and development effort, but in some cases it took decades to develop them. Only by continuing this robust effort will we ensure that we have the technology and weapons to meet the challenge of another Saddam Hussein at some future date.

This subcommittee has a critical role in this endeavor and I expect that under your leadership and that of the ranking member, Senator Wallop, we will provide the Army and the other services the support needed to maintain this Nation's military superiority well into the next century.

Thank you, Mr. Chairman.

Senator LEVIN. Mr. Conver, whenever you are ready, please proceed.

STATEMENT OF HON. STEPHEN K. CONVER, ASSISTANT SECRETARY OF THE ARMY, RESEARCH, DEVELOPMENT, AND ACQUISITION; ACCOMPANIED BY MAJ. GEN. RICHARD D. BELTSON, USA, DEPUTY FOR SYSTEMS MANAGEMENT, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY, RESEARCH, DEVELOPMENT, AND ACQUISITION

Mr. CONVER. Thank you, Mr. Chairman. It is a pleasure to be here with General Beltson. I think you find a fair amount of resonance among your witnesses today with the remarks that you made. We share your views on virtually everything that you have said about the Army and its funding. We are trying to work the problem with limited resources, but I will tell you it is a little bit tough. I have submitted a written statement to the committee, and with your permission, we would ask that that be put in the record.

Senator LEVIN. Thank you. It will be made a part of the record.

Mr. CONVER. I would like to make a few brief remarks that I think will touch on some of the subjects that you and Senator Wallop mentioned in your opening remarks, and I would like to ask General Beltson to say a few brief remarks, perhaps building on from an acquisition point of view some of the remarks that General McCaffrey and others may have made yesterday about Operation Desert Storm. But let me address some of the more fundamental issues associated with first Operation Desert Storm and then what I would describe as the state of Army acquisition.

Regarding Operation Desert Storm, the first thing that needs to be said and that we would like to say is that we appreciate the support of your subcommittee, you and Senator Wallop, over the past many years for your support of the Army and your support of conventional forces. In particular, we would like to express our gratitude to you for the support that you provided specifically to make the weapons system capabilities available that performed so admirably in Operation Desert Storm. We in the Army know where that support comes from, and we are very grateful for it. So, sir, thank you.

Senator LEVIN. Thank you.

Mr. CONVER. I guess coming in on Operation Desert Storm and trying to stand back a little bit, I think it is important that we keep things in perspective. It is very difficult, I think, for us to keep it in perspective because, frankly, over in the Pentagon and out in the field everybody in the Army is almost euphoric about the performance of the weapons systems in the Gulf. Given that feeling that our weapons systems performed even better than we might have expected in some instances, it is difficult to keep it in perspective, but we are trying very hard to do that.

While we were very pleased with the performance of the weapons systems, there are some things obviously that did not work as well as we would like, and we are trying to capture up some of those lessons learned so that we can make the systems perform even better in the future.

Now I guess there is a tendency initially for some people to oversell the performance of systems in the Gulf, and whenever that happens I think there tends to be a corrective action. People will come from other quarters and say, no, it really was not all that good, and we have seen that happening across the board, most recently on the performance of the Patriot system. I do not necessarily want to open up that whole debate, but I will tell you that the Patriot system performed as well as could have been expected for a system that really was not designed for the Anti-Tactical Ballistic Missile (ATBM) role. Given its inherent limitations which are based on the laws of physics, it is hard for me to imagine that the Patriot could have done much better. It is not the ultimate Anti-Tactical Ballistic Missile weapon, but it certainly did a credible job. I think that is probably true across the board. There are certainly some things that could be improved, but generally speaking we are quite pleased.

Senator WALLOP. Secretary Conver, forgive the interruption, but have you found anybody who wished that we had not sent the Patriot over there?

Mr. CONVER. No, sir. I do not think you would find that. I think as you stand back and observe the debate that seems to have taken place over the past couple of weeks, there are obviously those who feel that we or others may have oversold the performance of the Patriot, and we are trying to keep that all in perspective. It is not the ultimate weapon, but it did quite well given what it was designed to do.

Likewise, we are very pleased with the performance of most all of our weapons systems across the board. General McCaffrey went into much of that yesterday. I understand he talked at some length about the Bradley and other systems. As I mentioned, General Beltson will try to elaborate on that a little bit.

Now one of the things that does distress us a little bit is we hear and read some of the critics now coming back and saying, well, the weapons systems really did not work very well. In fact, I understand that one of our so-called defense expert critics was heard to make the statement, I believe, in congressional testimony that the reason we won the war was because we had well-trained soldiers and excellent doctrine and that the doctrine and the training were so good that in fact we could have swapped weapons with the Iraqis and the outcome of the war would have been the same. I was not

physically present when this statement was made, but that is the way it was reported to me. If somebody really did say that, I must say, that is one of the most absurd statements I have ever heard.

Now granted, I believe that the performance of one army fighting against another army is clearly a function of training and doctrine, but it is also a function of equipment. It is ludicrous to say that you could remove any one of those pieces and achieve the same outcome. That is particularly true in the case of the equipment. If you take away the air superiority which we enjoyed and you had a pure ground war, it is hard to imagine with the advantages that we had in our equipment that the result could have been different.

Just running down the list quickly of a few things, night vision equipment, the ability to see at night, the ability to see through dust and smoke and the oil fires and so forth, the ability of our weapons to outrange those of the Iraqis primarily in the area of tanks. We had an advantage of about 1 kilometer of outranging capability. We could shoot them, stand 1 kilometer away and shoot them for 1 kilometer before they could shoot us. That is a very significant capability. The whole spectrum of smart weapons it seems to me was very decisive.

Likewise, when you look at the lethality and survivability of our systems, I think there is no comparison. It would not be stretching the point too far to say that our tanks were virtually impervious to the tank rounds coming from the Iraqi tanks, even the best T-72 tanks. We have heard stories of the tank rounds. The T-72 literally bouncing off the frontal glacis armor of the M1 tank.

On the other hand, the lethality of our tanks was such that not only could we take out the Iraqi tanks, we in some instances even shot through sand berms and took out a tank on the other side. After the long rod penetrators would go through sand, you could still take out a tank on the other side.

The mobility of our forces was very decisive, the ability to make these 300-mile marches and having the reliability to be able to do that, having all the other equipment that could keep up with the tanks.

So if someone were to suggest that we could swap equipment and still carry the day with superior-trained soldiers and doctrine, I just simply find that a ludicrous statement.

Now another point that has to be made about the Operation Desert Storm experience is that the performance we achieved was largely a function of research that was carried out in the 1970s and production essentially that was carried out in the 1980s. The big question that I have as the current custodian of Army acquisition is where are we going to be if we have to fight another Operation Desert Storm or other type of land combat in the next decade.

I have the pleasure of reaping the benefits and receiving the accolades for work that was really accomplished well before my watch, but I will tell you that my successors down the road will be sitting perhaps in this same room bearing the brunt of criticism because the equipment that we will be fielding or that we will not be fielding will put us in a posture where we may not be able to conduct a successful operation like this say a decade from now. So I think we need to keep that all in perspective as well.

That gives me a lead-in to a couple of brief things I would like to say about what I would call the state of Army acquisition. I think we have three problems in acquisition that I have been working hard on in the 15 months I have been in this job. The first one is trying to make sure that our requirements process is matched up with the acquisition process. That is basically reconciling the differences of opinion that might normally exist between the users of new equipment and the people that have to develop it. I will say a few words about that.

Second, I think we have a problem in development contracting. We have a problem controlling the cost of development contracts. I think my view of that is perhaps somewhat different from the conventional wisdom. I would like to say a few words about that.

Finally, our big problem is procurement funding. As you suggested in both of your opening statements, the level at which the Army is funded now for procurement, I think, threatens our ability to modernize, and I will say a couple of brief remarks about that.

First on the requirement side, it is very important that when the users come up and tell us they want a piece of equipment that has certain capabilities that we can develop an acquisition strategy that matches the user requirements. If there is a mismatch, and we proceed in the face of that mismatch, we will inevitably get an acquisition program that somewhere down the road will fall apart and be flawed. So recognizing that, we have tried very hard to make sure for all the new systems that are coming along—and there are not very many of them—that the requirements and the acquisition strategy are in consonance with one another. We have done that in the past with two systems that I know are of interest to this committee.

One is the Armored Gun System (AGS) that I know this committee has taken a keen interest in. The other one is the Nonline of Sight (NLDS) system or the Fiber Optic Guided Missile (FOG-M) technology. I know that this committee and Senator Shelby in particular have taken an interest in the FOG-M.

In both those instances, we have sat down and forced the process to reconcile the requirements that the user has and the acquisition strategy. In other words, what are we actually able to deliver? I think we have been very successful in that.

To do that, our current vice chief and our future chief, General Gordon Sullivan, has taken the lead, and he has forced the acquisition community and the requirements community at the four star level into the same room, and will not let us out of that room until we have an acquisition strategy and a requirement statement that match. By virtue of that process, which is a very effective one, General Sullivan has forced agreement between the acquisition and the requirements leaders. I will continue to adopt that practice in the Army under General Sullivan's leadership as chief.

Now the second problem that I alluded to was that of development contracting. I will tell you that the development programs that we have in the Army right now do not have a good track record as far as delivering on time and under cost. The reasons for that, I think, are somewhat different than the conventional wisdom.

The conventional wisdom would say that contracts overrun: (a) because contractors are greedy, and (b) because the Government people are essentially incompetent bureaucrats who mess it up. Now true, there may be some greed. True, there may be some incompetence, and we may have trouble executing, but I think the major reason that we have these problems in executing development contracts is that we do not have the incentives in place to get the contractors to bid realistically.

Basically, when the contractors come in to do some development work, especially if there is a cost type arrangement, but even under a fixed price contracting arrangement, contractors want the business so bad that they tend to bid whatever it takes to win the contract. Often we find that they will bid far below the Government estimate. Indeed, that is what happened on the FOG–M program that we finally had to cancel. The contractors bid literally only half the amount the Government had estimated this work would take.

It should not have been surprising to us, overruns grew to such a magnitude that we finally had to pull the plug. While FOG–M is an extreme case, we have, I am sorry to say, many other examples in the Army where we have done that.

Now what are we doing to fix that? I think the secret to this lies in some fairly obvious directions. First of all, we have to convince contractors they must bid realistically. We cannot encourage this buying, which all too often is accompanied by the notion, do not worry, you will get well in procurement. That is the combination of two bad ideas. So in my view we must tell the contractors you will be judged not on the basis of how low you bid, but you will be judged on the basis of how realistically you bid. When we do our source selections, we will not go for the low price bidder, we will go for the best value. Best value will take into account the technical approach and a realistic cost, not necessarily a low cost.

Next is the opportunity we have to incentivize contractors to actually deliver once we make the award. There are a couple things we can do that we typically, in my view, have not emphasized enough. One is to provide a carrot; that is, tell the contractor to give us a realistic bid, and if you deliver at less than the bid we will share the benefits of that underrun with you perhaps on up to a 50/50 basis or so. That is the carrot.

There should also be a stick. We need to have award fees that are significant enough that in dollar amounts to make a difference, and they will incentivize the contractors, and they will really go after the award fees. But there should be a penalty. If the guy overruns his contract, I think he should surrender fee, maybe, 50 cents on the dollar basis until the fee is exhausted. So I think if we start doing business in this way, we will find that our performance in executing these development contracts will improve dramatically.

Unfortunately, the only opportunity we have had to do this so far has been the light helicopter, the Comanche helicopter. We have an effective incentive structure in place on that contract, and we have gone to great pains to make sure we have a reasonable chance of getting contractors to deliver on time and within cost.

We geared the entire source selection process to doing it right on the Light Helicopter (LH), and I believe we have.

Let me turn now to the problem to which you alluded earlier and speak briefly about procurement funding, because, indeed, that is the biggest problem facing Army acquisition today. If you looked at the documentation that we sent with the President's budget, you will notice that procurement funding for the Army this year is roughly $8 billion. Eight billion dollars is a reduction of over $6 billion from where we were in procurement just 2 short years ago. We had $14.3 billion in procurement in the 1990 budget, and now we are down to $8 billion. This represents only 13 percent of the total money that the Department of Defense will spend on procurement. So when you talk about the Army being the poor stepchild, I think the fact that we have 13 percent of the defense procurement budget is perhaps an indication that maybe that is kind of a true statement.

Now you mentioned the Big Six in your statement, Mr. Chairman. We always talk about the Big Five, but certainly the MLRS is as important to us as the other five systems. You are absolutely correct, we either have or will shortly terminate production for each of the Big Six systems. That represents a problem for us because we have nothing to bridge the gap between the cessation of production of those Big Six systems and the start new system production which occurs generally after the year 2000. We have created an industrial base problem, therefore, to which you have also alluded.

I will point out to you another statistic that I find rather telling; that is, since fiscal year 1985 which most people consider the height of the defense buildup, the Army has lost 64 percent of its purchasing power in procurement. That is basically a two-thirds reduction of Army procurement purchasing power since 1985, and I will tell you frankly as the Army acquisition executive, I worry every day that with the level of funding we have we are not going to be able to modernize the Army the way that we should.

Now what problems does it cause for the Army when we send over a procurement budget to you that has funding at such a low level?

First of all, as I mentioned, it threatens our military capability. We simply will not be able to develop new capabilities in the near term. That means that if we have an Operation Desert Storm in 10 years we will be fighting it with the same items of equipment we used in Operation Desert Storm, and that equipment will be unimproved. We will still be fighting with unimproved Apaches or unimproved M1A1 tanks or even more primitive versions of the M1, et cetera. So diminished military capability is the first thing.

Second, when we send over a low budget like that to you, it is much lower than in previous years even. We send a message to Congress, we send a message to OSD, and that is not a good message. It is a message of inconsistency. What we are saying to you with our budget is that we are not serious about procurement. The programs in the budget that we sent you this year bear very little resemblance to what we sent you last year because we have had to reshuffle the deck so much in order to accommodate programs

within $8 billion. So we send a bad signal that reflects badly on our dedication.

Third is the point to which Senator Levin has referred. We create big problems for the industrial base, and we can go through for any of the industries you care to discuss and tell you how the industrial base is suffering.

There is a fourth problem, and that is that once your procurement funding gets as low as $8 billion, I do not know how in the world you get it back up where it needs to be to buy future systems like LH and ASM and all the new systems that we would like to buy toward the end of this decade. Once you get your funding down to $8 billion, it will be very hard to climb back up that mountain.

I will mention just one other thing. You alluded to the fact that it has a big effect on our unit costs. There is great inefficiency when procurement funding is reduced to that level and you try to do essentially the same number of things with greatly reduced dollars. That means production at very inefficient rates. We have several examples of that. You terminate some production lines. That leaves you without an industrial base that you will need to build the follow-on systems. Another more subtle thing, it forces us to keep our older equipment longer. The older it gets, the higher the operating and support costs get; and, therefore, the higher O&S costs rob the money that otherwise could be spent for replacement or upgrades.

So there are all kinds of problems that we create for ourselves when we let the funding get down to that level in procurement. Now let there be no mistake about it, the big problem in Army procurement today is money. The solution to the problems of Army procurement is equally simple: more money. We simply need more money to modernize the Army than we have. In my view as the custodian of Army acquisition and of modernization policy, I feel that without more money to upgrade the capabilities of the Army on a continuous basis as opposed to on a sporadic basis, I just do not think we can do what we owe the soldier and the American taxpayer.

What are we not doing? You can put them into several categories. There are major areas of Army combat capability where we are not buying new production equipment and where we are not upgrading equipment we have. We can certainly look at the tank, we could look at the Apache, and we can look at the Bradley. We do not have in the current budget programs to upgrade any of these systems. We do have a modest Apache upgrade program, however I would argue that it is more of a patchwork program than a systematic upgrade program.

Getting to your point on inefficiency and unit cost, we have been forced to reduce the quantities to minimum sustaining rates or below across the board. Just a few of the systems, just a small list of what could be a large litany, Stinger, MLRS, Howitzer Improvement Program (HIP), SADARM program, Family of Medium Tactical Vehicles (FMTV), and SINCGARS radios. These are just a few examples of a whole host of systems where we have reduced the acquisition, the procurement quantities, to such a level that the unit costs are teetering on the verge of really not being affordable.

There are some areas where we have no program at all. We really do not have a recovery vehicle program. We do not have a program to replace or extend the life of UH1 Huey helicopters which are 30 or so years old. So there are all kinds of things begging to be done in Army acquisition, lots and lots of good programs. We hear words about crisis in various areas of the defense budget, concerns about the naval aviation program, and I am here to tell you we have problems in the Army acquisition program across the board. It is just as serious as any of the others.

The solution to this, as I mentioned, is more money. Now where can we get the money? It seems to me there are three ways we can do it. One is we can get more total money for the Department of Defense, and I think that is in the too hard pile. We cannot do that in the near term without a massive shift in political orientation toward the Department of Defense. Sooner or later we are going to have to come to grips with the fact that we cannot subsist on negative real growth in defense year after year, but I do not think that is going to solve the Army's procurement near-term problem.

Second, we can reallocate within the Department of Defense and shift funds within the Department of Defense from some programs to other programs. We will argue to the best of our ability for such a reallocation. I can make no promises on how successful we will be. I can only promise you good effort.

Finally, we can reallocate within the Army, but there is not a lot of money to be reallocated because we have already taken the size of the Army down by one-third. No one is going to sign up for reducing readiness of the smaller force. We are not going to eat the seed corn and go after the RDT&E accounts. So about the only way we can do it by reallocating within the Army is to look at the operations and maintenance account and see if there are some things on the margin we can do to be more efficient in a way that will allow us to divert some funds to procurement.

Now a couple of ideas that come to mind, we can use contractor logistic support instead of organic support. That might save some money. We might be able to use more simulation as opposed to have OPTEMPO, having troops actually driving and flying around in tanks and helicopters, and initiatives like that. Basically, we are operating on the margin with that because the Army just does not have a lot of money to move around.

So there are three ways, and none of them is particularly attractive. I do not know where the answer to this lies, but I will assure you that we will do our best to work the problem within the Department of Defense. We appreciate all your efforts to address the conventional forces and the Army in particular in the subcommittee.

With that, sir, I would like to ask General Beltson to say a few brief words about Operation Desert Storm from an acquisition point of view and from his personal perspective. After that, we would be delighted to take your questions.

Senator LEVIN. Thank you so much, Mr. Conver. General Beltson.

STATEMENT OF MAJ. GEN. RICHARD D. BELTSON, USA, DEPUTY FOR SYSTEMS MANAGEMENT, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY, RESEARCH, DEVELOPMENT, AND ACQUISITION

General BELTSON. Mr. Chairman and Senator Wallop, it is certainly my pleasure to be here. I would like to speak very briefly if you will indulge me, as both an appreciative soldier and also a grateful father. I have two sons. One is an Apache pilot who graduated too late to make the war, but nevertheless he is very pleased with his equipment. The second is an M1A1 platoon leader in the Third Armored Division. I believe he is currently in Kuwait. He has not called me collect in the last month.

Sir, I would tell you that from our perspective as we look at the emerging results from an equipment perspective and some other intangibles, there are four key factors that seem to be dominant. First, we had some extremely high quality men and women in the force. They were equipped with superb weapons and gear. They had some tough and realistic training, and we were blessed with some outstanding leadership.

While we have mostly good news, there are some areas that need improvement, and I will touch briefly on both. First, on the positive side, the M1A1 was a real winner. My son told me that his tank had 2,500 kilometers on it the last time he called me, and it had made the trek all the way from Saudi through Iraq and back into Kuwait. His platoon of four tanks made the entire trek unscathed, one glancing blow, no breakdowns, and was just a tremendous event from his perspective.

He was extremely pleased with the ammunition. The M829A1 ammunition was absolutely dynamite. He lost his range finder, went to a battle site zero setting, and hit everything he shot at because the round was so hot and had a flat trajectory. His wing man's opening shot was 2,400 meters through a berm and hit a BMP with a resulting catastrophic kill. So from his perspective he was just thrilled with what he had to go to war with, and it worked extremely well.

The Bradley exceeded all our expectations. Teamed with the Abrams as the fighting vehicle and also on its own, it did extremely well.

Ammunition, all of our ammunition across the board is extremely lethal.

The night vision equipment enabled us to own the night.

HEMTTs and HMMWVs were the work horses of our force and received universal praise.

Apaches were vindicated. The combat multipliers provided by that helicopter far exceeded even our simulations.

ATACMS and MLRS were devastating and also quite demoralizing to the enemy force.

GPS was a shining star. We cannot get enough of the GPS devices.

JSTARS was a surprise winner when we ran it to the Gulf.

Patriot was both a war fighting and a political weapon, and we are all well aware of what it did.

Finally, our AirLand battle doctrine vindicated our training, our doctrine, and our leader development. The use of AirLand battle was, I think, a key to our success.

However, there are some areas that need improvement. Fratricide is a major concern, and we are working hard to solve that problem.

We have some mobility disparities that were evident in both combat support; that is, with weapons that could not keep up with the modernized maneuver force.

Combat service support; that is, feeding the force with ammunition and other supplies will need some work.

We had a disparity in our Scout helicopter; that is, the OH-58 could not keep up with the Apache, and, therefore, the Apaches in many cases ran off and left the Scouts.

There is a crying need for position navigation, especially Global Positioning System (GPS).

Our communications system was good, but the AirLand battle distances exposed some flaws in our command, control, and communications in terms of the distances involved.

Countermobility and chemical protection were scarce. We certainly need to work both of those two areas.

UAVs were limited in quantity but they were effective and in great demand. We need to see if we can accelerate that program and get that capability into the force.

Strategic and tactical lift needs a boost.

Finally, and not because it is of least importance, because I think it is of most importance, the soldier needs help. Soldier tactical living, for example, is a deficiency we cannot neglect. We need to do more to make his lot in life more palatable.

In summary, we could not be more pleased with the outcome of the war and the minimum casualties. We are grateful for the support of Congress and the subcommittee and especially the Nation for its support of our forces. We thank the committee for both your foresight and your continuing support.

Sir, I am ready for your questions.

[The prepared joint statement of Mr. Conver and General Beltson follows:]

PREPARED JOINT STATEMENT BY HON. STEPHEN K. CONVER, ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, AND MAJ. GEN. RICHARD D. BELTSON, DEPUTY FOR SYSTEMS MANAGEMENT, OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY FOR RESEARCH, DEVELOPMENT, AND ACQUISITION

Mr. Chairman, members of the committee, thank you for this opportunity to appear before you to discuss our plans for force modernization in the context of our fiscal years 1992-1993 budget request. I have provided you a formal statement entitled "Equipping the U.S. Army," and I would appreciate it being placed in the record. I also have brief remarks.

[The statement referred to is retained in committee files.]

Our primary responsibility in the research, development, and acquisition (RDA) business is to provide our soldiers with high quality, cost-effective combat equipment, in a timely manner, to enable them to successfully and decisively execute global strategic roles. It is this continuous modernization that brings state-of-the-art weapons into the hands of our soldiers. Success, to a large extent, depends on the vitality and strength of Army research and development (R&D) activities, and the technology base. The RDT&E budget request for fiscal year 1992 totals $6.24 billion, which is significant when compared to the overall Army RDA budget request which

totals $14.27 billion. Forty four percent of our entire budget in fiscal year 1992 will be devoted to RDT&E, and in fiscal year 1993 we plan to keep it on a steady course.

We will use these funds to focus on technologies that meet the highest priority warfighting capability needs for each dollar spent, and to accelerate those areas of greatest promise. High technology R&D and a vibrant technology base are, and will remain, central features of the Army's modernization strategy.

The world marveled at the performance and reliability of Army weapon systems in the Persian Gulf—the Apache, Abrams tank, Bradley Fighting Vehicle, Multiple Launched Rocket System (MLRS), Army Tactical Missile System (ATACMS), and the Patriot air defense system. As we work together on the fiscal year 1992 budget and those budgets of future years, it is important to recall how well our systems performed in Southwest Asia, the most realistic, comprehensive operational test conducted to date.

There is tremendous pride in the many communities that furthered these systems through the years—the scientists and engineers, defense industry workers, Department of Defense (DOD) personnel, both civilian and military, and, perhaps most importantly, Members of Congress, who, as elected representatives, spoke for the American people by supporting these significant programs. I think the Army has proved that we are good stewards of the resources provided us. Nevertheless, we owe a special debt of gratitude to the Congress and the American people.

I hasten to add, however, that these highly capable systems which have proven their worth in the test of combat and which we applaud today, are the products of efforts in R&D and the technology base that took place 10, 20, or more years ago. Yet, these capabilities developed and first funded a decade or more ago gave us the technological edge that made the decisive difference between failure or success on the battlefield today.

The performance of our weapon systems in Operation Desert Storm has validated many of the issues that have been the underpinnings of our defense acquisition strategy for a number of years. There were those who argued that it didn't make sense to rely upon high technology weaponry. That, in fact, this high technology was more expensive and, therefore, we would not be able to buy equipment in sufficient numbers as to be militarily significant. I think few would argue now that our approach of going with the high technology solution is a wise one. Time and technology do not stand still. We must preserve our technological superiority.

It would be difficult if not impossible to compare our success in Southwest Asia to our battlefield requirements as we enter the 21st century. The threat is evolving and becoming more technologically advanced in all aspects of lethality, protection, and mobility. Lessons learned from Operation Desert Storm are being analyzed, and, while underway, the process will take some time. Deficiencies will be noted and technologies developed to counter these faults. New systems will be developed, and existing systems will be upgraded.

Our current systems are not designed to meet the projected future threat. Tomorrow's battlefield will see increased firepower, better armor protection, and more advanced target acquisition systems. The key to success on the battlefield of the future will be the modernization decisions we make today. Just as our success in Southwest Asia depended on tough decisions made a decade or more ago.

While the Army is making a determined effort to protect RDT&E programs as an investment in our future, our procurement account is suffering. It may be that another conflict, similar to Operation Desert Storm, during the remainder of this decade may require that our soldiers rely upon the exact same weapon systems that our soldiers relied upon in the Persian Gulf. Army modernization efforts are severely curtailed by constrained resources.

At our fiscal year 1992 funding level, $8.02 billion for procurement with a further decline projected in fiscal year 1993, there is a large gap in funding and time before we field our next generation weapon systems. Our two Army priorities, both part of the RDT&E budget request, are the LH, the centerpiece of our aviation modernization program, and the ASM program, our family of six integrated systems that will equip our future armored forces.

The fiscal year 1992 Army procurement budget is 13 percent of the total DOD procurement budget ($63.4 billion). In other words for every dollar DOD will spend on the procurement of weapon systems, the Army will receive 13 cents. From fiscal year 1990 to fiscal year 1993, Army total obligation authority (TOA) decreased by $3 billion. During that same period, Army RDA decreased by $6 billion. In less than 10 years there has been a deep decline in the Army procurement budget. Since fiscal year 1985, the Army procurement account in real dollars declined 64 percent. Furthermore, it is projected to fall to $7.6 billion in fiscal year 1993. While we are counting on our two major future systems—LH and ASM—to help us raise the pro-

curement account in the years ahead, there is grave danger in letting our procurement dollars get too low in the first place.

Here's what I believe has happened. In the 1980s, the Army had in production what we called the "Big Five" weapon systems: Abrams, Bradley, Apache, the Black Hawk medium lift helicopter, and Patriot. With all those systems in production, our procurement dollars were running at about $18 billion annually.

What has happened in the recent past to those systems? This enormous modernization effort, which had tremendous success in Operation Desert Storm, has ended. The fiscal year 1992 budget contains only procurement money for an additional quantity of Black Hawks to upgrade National Guard and Army Reserve equipment. Although we are looking at this upgrade work and some foreign military sales, the bottom line is that the procurement funds associated with the "Big Five" are gone.

Therefore, I believe that we need to be concerned about our future prospects in the procurement and modernization business. For example, consider our top 10 Army programs in terms of dollars now and in the recent past. In 1985, along with the "Big Five," we had the MLRS and several other significant programs. The smallest annual procurement then for any of the top 10 systems was about $450 million. Consider the top 10 today. Above the level of $450 million, which was the lowest funded program on the 1985 list, we have two programs. The top one, LH, is an R&D program, and number two is the Black Hawk (UH-60) upgrade. Every single one of the other programs on our top 10 list is less than $300 million a year.

Why has this happened? Given a decline in the total dollars available to the Army, we have tried to maintain the ability of the Army to execute short notice operations, building down end strength and force structure in such a way that it will not rupture the force or give us a hollow national military strategy. While I have no problem with this approach, one significant result is that acquisition alone has taken a very substantial portion of the overall funding cuts.

The Army of tomorrow must have certain characteristics in order to accomplish its strategic mission in the future global security environment. First of all, the Army must be versatile. We must be able to accomplish a wide range of missions while drawing from a smaller force structure. Our forces must be able to respond to a broad range of possible conflicts and contingencies. This range of possible conflict makes it ill-advised to procure single purpose equipment and dictates equipment that is equally versatile.

Second, the Army of the future must be deployable so that it can project forces to wherever U.S. interests are threatened. Operation Desert Storm evidenced that even the most deployable and combat-ready land force cannot be employed without adequate airlift and sealift. This necessitates equipment which is easily deployable and in some cases, such as the LH, self deployable.

Third, and most importantly, the equipment must be lethal. No longer can we expect to have redundant systems and capabilities. Weapons designed to destroy targets must do exactly that, without reliance on back-ups or multiple engagements.

Our modernization strategy is comprised of a series of coordinated plans to ensure that our warfighting capabilities overmatch our potential adversaries. These plans include the appropriate mix of heavy, medium, and light equipment for our future smaller force. Our high priority programs include the Armored Systems Modernization (ASM) program, the next generation of armored combat systems with greatly enhanced lethality and survivability.

Briefly, ASM is a family of six new developmental systems, four on a heavy protection level chassis, and two on a medium protection level chassis, which emphasize commonality and modularity within each level. The heavy protection systems are the Block III tank, the Advanced Field Artillery System (AFAS), the Combat Mobility Vehicle (CMV), and the Future Infantry Fighting Vehicle (FIFC). The chassis for these systems are currently under development. The medium protection systems are the Line-of-Sight Anti-tank (LOSAT) tank killer, and the rearm and resupply vehicle for the new artillery system, the Future Armored Resupply Vehicle—Ammunition (FARV-A). These systems will use modifications of the Bradley and the Multiple Launch Rocket System (MLRS) chassis, respectively.

ASM, with its six systems, is a research and development effort that focuses on advanced technologies and commonality, resulting in operational enhancements, cost savings in development, production and support, and operational and support manpower savings.

A top priority program central to our future success in close, deep, and rear operations is the reconnaissance, maneuver, and fire capability of our armed LH and the improved firepower and kill rate of the AH-64 Apache helicopter with the Longbow. The LH will replace the AH-1, OH-6, and OH-58 light helicopter fleet and complement the AH-64. Enhanced combat capability is achieved through the use of ad-

vanced technologies in the Mission Equipment Package (MEP), airframe, and engines. LH is the system that will take Army aviation into the 21st century.

Let me highlight some of our least visible, yet critically important, products of the research, development, and acquisition effort to equip our soldiers. These include our tactical wheeled vehicles, which are absolutely essential to our warfighting capability. The light fleet will continue to be strengthened by procurement of the High Mobility Multipurpose Wheeled Vehicle (HMMWV). The importance of the HMMWV was seen during Operation Desert Storm. The medium tactical vehicle or the "workhorse" for the Army is the Family of Medium Tactical Vehicles (FMTV). The FMTV program provides an improved medium truck family with enhanced mobility using current automotive technology to replace over aged 2½ ton trucks and help alleviate the critical shortage of 5 ton trucks. The FMTV consists of a "family" of vehicles which emphasize logistics commonality.

Each of our modernization plans encompasses systems or families of systems with similar combat functions. I have chosen to highlight only a few of our priority programs to illustrate our commitment to providing our soldiers on the future battlefield with an appropriate mix of light, medium, and heavy equipment. We are committed to a balanced force.

So how do we proceed? I agree that we needed to look again at the strategy of accepting near and mid-term risk and foregoing our production, because near-term production and product improvement may be necessary to maintain essential capabilities and to maintain our defense industrial base. Underlying the principle of accepting near-term risk and stopping our major production were two implicit assumptions.

One, that the industrial base for production of Army weapon systems would sustain itself in the absence of continued production. We have assumed that when we commence production of a new ASM Block III tank sometime in the late 1990s, that somehow the prime contractors and the several tiers of vendors and subcontractors who are involved in that work, would sustain themselves and be there for us. Our challenge will be to ensure both adequate R&D and the ability to produce the next generation of systems.

The second thing that we have assumed implicitly in this modernization strategy, is that we would be able to procure these long-term systems on approximately the schedules that we have projected. For example, we have assumed that we will achieve the LH Initial Operational Capability (IOC) in 1998, and that we will get the First Unit Equipped (FUE) Block III tank several years later, and so forth.

What are the solutions? One solution is that we have to be very smart in the programs that we put in our budget. Given that our dollars are so small, we've got to be careful that the programs in our budget are ones that are the most likely to succeed.

I think there are three criteria that we need to apply to any production or modernization that we're contemplating. One, any proposed improvement or new program has to meet an operational need. It has to help the soldier. Two, it has to be executable. We have to support programs that we can get through the acquisition process without major problems. Third, and perhaps most importantly, a program must be approvable by the Office of the Secretary of Defense (OSD) and the Congress, and we must be careful not to oversell it. We cannot go to OSD or the Congress and promise things we cannot deliver. When we contemplate the few new programs we will have in the next few years, we should think more about program execution than we do about program marketing. It is one thing to sell a program on the basis of predicted capability, schedule, or cost, but we had better be able to meet our predictions. Those three factors—need, executability, and approvability—are the three criteria I think we ought to apply to any proposed weapon system or product improvement.

While we have demonstrated that given adequate funding, we can produce world class weapon systems, we have a long way to go toward improving the process by which we buy these systems. We are always looking to improve the acquisition process, and one way is to provide incentives. There have to be good incentives on both the government and on the industry side to set up a program in such a way that we can deliver it with the required performance, under schedule, and on or under cost. We had a recent example in which we witnessed the failure of the process to produce acceptable results, particularly in terms of developing weapon systems.

The Army was forced to cancel the Non Line of Sight (NLOS) or Fiber Optic Guided-Missile (FOG-M) program. I don't want to point fingers because this was not the fault of the government, nor the fault of industry alone. It was a collective problem. I believe the reason we were in the situation where we had a massive overrun that ultimately required cancellation of the NLOS program, was because our pro-

curement system for that particular bid and for many others, is set up in a way that provides incentives for contractors to "buy into" contracts from the very beginning for an amount that is far below the target cost.

The NLOS contract was cost-type, which stated essentially that we, the government, would pay the contractor whatever it costs to build the program, within reason. While there were some incentive features in that and many of our other development contracts, we essentially said go ahead and give us your best bid. The contractor, in order to win the award, submitted the lowest bid with the knowledge that the government would cover overruns.

So, looking at the whole problem, a cost-plus environment, encourages contractors to bid on contracts at levels that are guaranteed to overrun. What do we do to fix that? While I don't have any magic answers, I do have some suggestions. I think we have to fix the incentive structure. As a matter of government policy, we should fully fund our R&D efforts, rather than expect the contractors to help fund those efforts. Second, we should abandon the notion that somehow contractors should be able to "get well" in procurement. Production is no longer guaranteed. Third, we must incentivize contractors to submit realistic offers rather than buying in at unexecutably low levels. Fourth, we need to balance risk appropriately between the contractor and the government. I think we should look at our development programs and try to assess how much risk they have. If it's a relatively low risk program, then we ought to put a fairly severe burden on the contractors to stand behind their development efforts with risk predominantly on the contractor's side. If it's a high risk program, then I would argue the government ought to take the preponderance of the risk. We should not put our contractors in the position of having to bet their companies every time they sign a government contract. Fifth, if we are to make this whole thing work, we have to adopt a posture where we are going to select our contractors not on the basis of low price, but on the basis of "best value." I don't want to send a single soldier into battle with a weapon system that went to the low price bidder, unless that bidder is also the best technically.

What I am talking about is trying to incorporate the best features of the cost-plus and the fixed-price contracts into a package that is tailored to the individual system as a function of how much risk is in the program. I am working on the development of this policy with my Program Executive Officers (PEOs), the Army Materiel Command (AMC), and major subordinate commanders. At this time of declining defense spending, we must find innovative ways to mitigate financial risk to DOD and our defense industry partners. I want the Army at the forefront of this effort.

While it is likely that tight defense budgets will be with us for the next several years, the changes to our acquisition strategies will serve as a foundation on which an improved relationship between government and industry is built. Reductions in defense dollars will lead to the production of smaller numbers of fewer weapon systems, and this limited production will inevitably lead to a smaller and more competitive industrial base. The Army must continue to modernize, and while our procurement is very low, I would like the Army at the forefront of this effort.

The procurement programs of the past, present, and the future Army would not be possible without the support of the Congress and the American people. While our systems have progressed from basic technology to high technology, we are now working on technological innovations that will take us into the 21st century. If some thought that the U.S. defense structure was largely a bluff, I think that notion has been put to rest. Our constant quest for excellence has been evidenced by our superior warfighting capability in the Persian Gulf. We prevailed, both in human and technological achievements.

Senator LEVIN. Thank you so much, General, for that very, very compelling testimony.

PRIME CONTRACTORS FOR COMBAT VEHICLES

First, Mr. Conver, I earlier quoted from the JCS net assessment, and where they said that in the future the number of major contractors of combat vehicles may shrink to unacceptably low levels and then said that the decreased defense spending may reduce the six prime contractors in combat vehicle production, that the projected end of the M2 and M3 fighting vehicles and the M1 tank programs will impact on this sector. What are the six prime contractors for combat vehicles?

Mr. CONVER. Now these companies are involved, for the most part, in current work, and they are also competitors for variance in the ASM program. Sir, right now the companies that are primarily involved in that work are BMY; FMC; General Dynamics; Land Systems Division; General Motors; Teledyne; and Cadillac Gauge are the primary companies involved in that sort of work.

EFFECTS OF SHUTTING DOWN PRODUCTION LINES

Senator LEVIN. The Army, through the economic necessities which you have outlined for other reasons, calls for terminating production of the M2 fighting vehicle and the M1 tank this year. What is going to be the effect on the cost on the future generation of fighting vehicles if the production facilities go cold?

Mr. CONVER. Sir, there is a lot of uncertainty in that, but when you let a line go cold you create innumerable problems. The most clear is the issue of reconstituting that industry when you want to build your next generation systems, so you get into the notion of startup costs.

In the case of the tank, for example, it has been estimated, with what precision I cannot attest, that the cost of shutting down the tank lines and then restarting it is on the order of $1.4 billion. It could be more than that. It is hard to imagine that it would be much less than that because, as you know so well, that is a very involved industry, and it has a lot of tooling, a lot of manpower, a lot of expertise.

There are dollar costs. There are also technology sacrifices you make or future opportunities that you forego from a technology point of view when you shut down a line. I guess we see this not only in the tanks, we see it on Stingers, we see it on all the things that we are terminating. If we do not make sure that we have at least one major supplier, high quality supplier that is viable within each of our major classes of equipment, then when you try to do the follow-on system you have to ask the question where do you go to have that system developed and built.

The budget path we are on right now will literally cause us to lose the industrial base certainly for tank production, it will cause us to lose the industrial base for single man portable, shoulder-fired missiles (Stinger) and their follow-ons. So we create great problems for ourself in terms not only of the additional cost of restarting but the more subtle cost of when you go to do these new systems that you have made these sacrifices for, who is going to build them. So in a general way, sir, I hope that answers your question.

Senator LEVIN. The M2 termination has another effect, and that is that there are a number of vehicles that depend on that Bradley chassis. Those are systems which we need to buy in the future such as MLRS. Is it not accurate that if we do shut down the Bradley line that we will be risking the production base for the MLRS?

General BELTSON. Yes, you are accurate in your statement. We are concerned about that. At the current rate, the Bradley production will start dipping below current levels in about the 1994, 1995 time frame. There is a real issue on the derivatives of the Bradley and whether or not the vendor will be a viable vendor for the de-

rivatives or the derivatives will cost so much we will not be able to afford them. We are trying to see what we need to do to bridge that gap, and we need to bridge it either with Foreign Military Sales (FMS) or we need to increase our production requirements. I know that the Deputy Chief of Staff for Operations is relooking at the Bradley requirements for a variety of other uses, and also they are revisiting the HMMWV Scout role as another potential procurement.

Senator LEVIN. Back to the M1 for just a moment, Mr. Conver. Last year all four committees of Congress authorized and appropriated funds for the Army to start a modification program for the older M1 tanks in order to upgrade them, to give them the fire power which has been so well described here and yesterday, among other things. Let me just ask you directly. In your judgment, was that decision one viable way to preserve the industrial base as well as to improve the combat capability of the Army?

Mr. CONVER. Yes, sir. That was the Army's position. As you know, we had a lot of discussion about this within the Army. The orientation of that discussion not being toward the usefulness of doing an upgrade program, the orientation of that discussion was really if we agreed to start this program, will we be able to afford the out-year funding requirements that would be associated with it.

I will tell you that after a long and somewhat difficult series of discussions within the Army leadership, we reached the decision that we would indeed support a tank upgrade program with the Army. We applied some $627 million in our budget over the Fiscal Year Defense Plan (FYDP) to start a modest tank upgrade program. $627 million is a fairly modest amount in that regard. But unfortunately, when we submitted that to the Department of Defense they did not determine that proposal to be in the best interest of the Army, so they denied our request. I will add as a footnote we lost the money that we had sort of put at risk in the budget process as well.

PROTECTING INDUSTRIAL BASE

Senator LEVIN. In addition to the tremendous combat capability that is added by that program—and again, I think it was described here today very dramatically as well as yesterday—is that also a way of protecting that unique industrial base in a cost efficient manner?

Mr. CONVER. Yes, sir. If you look at the tank production right now, we have some military sales that are estimated to carry the production of tanks for several years. We have two sales, one sale to the Saudis that is pretty well locked up, another potential sale to the Saudis, assuming that Congress will approve a Middle East arms package to our allies over there. We have the potential for sales to the United Kingdom, and at this point that does not look terribly optimistic, but we have a few others. The United Arab Emirates (UAE), I think is looking at tanks.

But even if our maximum for military sales materialized, we are still looking at that tank line going absolutely stone dead cold in late 1994 and 1995. I guess it is 1995. The new ASM Block III tank is not scheduled to begin serious production until the year 2002; I

think low rate initial production the year prior. But even under the best of circumstances, the gap that will be created in tank production will be 3½ to 4 years, and if some of the favorable assumptions do not materialize; namely, if the foreign military sales do not materialize in the quantity that we hope and expect and/or if the armored systems modernization program is delayed for whatever reason, that gap could grow from on the order of 4 years to something substantially in excess of that, perhaps a decade or more. So I would say yes. In light of the anticipated events both for the M1 tank and the follow-on tank, that industrial base is certainly in jeopardy.

Senator LEVIN. It would be greatly assisted by the upgrade program being funded?

Mr. CONVER. Yes, sir. I think that is true. It certainly would address the industrial base issue if we could put enough money in it to make it cost effective.

Senator WALLOP. Mr. Chairman, would you allow me a quick indulgence in there? A lot of people do not share the concern that you have just expressed because they think that you can let airplane production go down and then bring it back on, not realizing, of course, that there is a civilian sector that maintains an industrial base capable of building, whereas you just do not have a lot of uses for tank plants and armored vehicle plants other than armored vehicles and tanks.

Mr. CONVER. We have looked at that, and I guess on the order of 95 percent of the tank production is sort of defense unique. There are some things that perhaps would have commercial applications, some of the vendors, maybe some of the optics things. We have done a fairly detailed study of this. But by and large, it is fair to say that for the overwhelming part of it that is a defense unique industry. Now there are some pieces of it that are even worse than that. The Department of Energy special armored production facility, for example, is a facility which, once lost, perhaps could never be regenerated because that facility, if it had to be shut down, might fall into the same situation as the nuclear production reactors. It has environmental problems which are significant enough that once it is shut down it might be very difficult to start it back up as a new facility. We are coming right up against that decision, which I believe has to be made within this coming calendar year. So there are some pieces of this puzzle that not only would be difficult to regenerate but would be virtually impossible to regenerate, the armored probably being the best example of that.

Senator LEVIN. Basically, then, you are in agreement with what Senator Wallop just said about the unique defense characteristics of this industry?

Mr. CONVER. Yes, sir.

Senator LEVIN. It is not able as a practical matter to be sustained by commercial application?

Mr. CONVER. We are absolutely in agreement with that statement, yes, sir.

STINGER MISSILE

Senator LEVIN. You mentioned the Stinger missile program, and I want to just get comments on that and one other subject, and then we will turn it over to Senator Wallop. We will stick to a 10-minute rule here this morning because there are just 2 of us and we can work together on it just informally. The Army proposes to terminate the Stinger missile which is a proven system already in a number of areas. Originally, the Army had a requirement for 65,000 or more Stinger missiles. How many have been actually ordered and how many delivered?

Mr. CONVER. Sir, we will procure 38,089 missiles. Now some of those are not yet delivered. When I say procured, we have applied money and written contracts for 31,167. We currently have on hand about 15,000 missiles. So if we buy out everything that is on the books, though, we will end up with a peak inventory of about 32,000, which is a little more than half of what our original acquisition objective was.

Senator LEVIN. Stinger, as I understand it, was designed to be updated when new threat conditions developed, and the prime contractor has been the primary developer of the upgraded Stinger. If we stop buying Stinger missiles, how will the Army retain the engineering talent and the skills that it needs to modify the Stinger missiles that are in its inventory as we always contemplated doing?

Mr. CONVER. Sir, I think that will be pretty difficult. General Beltson might want to elaborate on this, but we are literally faced with the prospect—as you know, we are trying to bring a second source producer on which might seem rather peculiar in light of the fact that we are terminating the program, but we have a remaining buy that we can compete for of about 7,000 plus missiles.

Let us just assume for the moment that we end up with neither of those two producers in business. We will be violating the notion that says for each major class of weapons you ought to have at least one viable producer. If they go out of business, not only will you not be able to have a good modification program because you will lose the entire industry, both producers there, but you will also foreclose some opportunities to develop a follow-on to the Stinger, which is something we are interested in.

One might argue that we have a lot of missile producers. Our Stinger producers at this point are General Dynamics (GD), Valley Systems, and we are bringing Raytheon on as a second source. They will be the two Stinger-type missile producers. Now we have other people who make missiles. We have the Hughes Corporation and we have Martin Marietta, but so far those other companies have yet to build a missile like the Stinger. It is a small missile, lightweight, shoulder-fired, single-man portable. It is conceivable that if those two companies go out of the Stinger business that we might be able to resurrect some capability from them or the other missile producers.

I would personally be uncomfortable taking that risk, and that is why we are arguing within the Army to at least keep one producer going on a minimum sustaining rate basis at the very minimum, so that we can preserve our future options. That is a battle that has yet to be fought in its entirety, but I can tell you that from the

acquisition side we are arguing for maintaining at least one producer at a minimum sustaining rate. The arguments have not yet been made to the point where we have prevailed, and that is reflected in our budgets. But we have some other opportunities.

Senator LEVIN. In this year's budget request, that battle was lost?

Mr. CONVER. Yes, sir, it is.

Senator LEVIN. Not finally lost but at least set back, put it that way.

Mr. CONVER. Yes, sir. Now we do not have a problem in 1992, it turns out, because the missiles that we have on backlog on order, I mentioned that we had some 38,089 missiles that had either been procured and/or were on order. There are a number of missiles which are ordered but have not yet been delivered for various reasons. We can afford a skip year in fiscal year 1992, and we have structured our acquisition strategy so that we can get by 1992. Once we get to the end of 1992, though, our grace period is over, and we are going to have to address this problem in 1993. Otherwise, both those lines will go cold.

Senator LEVIN. The reason for trying to qualify a second source is because of your hopes for 1993? You did address it, but I did not quite understand your answer.

Mr. CONVER. No, sir. The reason for bringing on a second source is not a current reason, it is an old reason. The notion then was that we were going to buy 61,000 missiles, and it seemed to make a lot of sense to bring in a competitor to get some more favorable prices into the program. Indeed, we have seen some better prices. But if we had that decision to make all over again, it is doubtful that with a fairly small number remaining that we would go with it. But since we have started and Raytheon has put some of their own money into the program, and Raytheon is an excellent missile producer, rather than terminate Stinger, which is a decision frankly that we looked at, it seemed more sensible to allow Raytheon to continue and compete for a portion of the remaining 7,000 or so missiles. We would not do that if we were just looking at it today.

SOLDIER ENHANCEMENT PROGRAM

Senator LEVIN. My last question will be of General Beltson. You made reference for some major attention to be given to soldier tactical living, as you phrased it. Two years ago this committee, through the recommendation, by the way, of Les Brownlee of the subcommittee staff, started a soldier-marine enhancement program. That program, I believe, was intended to deal exactly with the problem that you addressed, and I would like to know what you are doing with that soldier-marine enhancement program.

General BELTSON. Sir, we appreciate Mr. Brownlee's interest from his previous position. I know he had some unique perspectives. As you realize, sir, when you get down to the small piece parts it does not have the sexiness of the large system, and so it kind of gets buried in the avalanche of major systems. So for us to start focusing on soldier enhancement I think is a good thing to do, and it is something we have probably neglected, and we intend to not try to neglect in the future.

We have had some program successes with the money that you have allocated to us. We have bought an intermediate cold wet glove. That is something between the light leather and the arctic glove.

We have a flameless ration heater. In 10 months we got a ballistic laser eye protection device. We have some alternate fabric for gortex, for example, and that will help drive the price down of that very expensive material.

We developed a 5-soldier crew tent. We have an improved desert uniform. We have the Schwarzkopf desert boot which we worked on, and we have some ration improvements, all of which are spinoffs of the money that came out of the solider enhancement program.

Underfunded is probably a bad phrase, but we did not put enough money in 1992, and in 1993 we are going to try to correct it as best we can within our internal reprogramming. I would tell you that of the soldier enhancement programs, it is hard to capture how much money you are spending in that, but when I asked the action officer who was running the program if he could give me an estimate in all of the various appropriations, he thought it was probably close to $200 million. I would contend that is probably still not enough, and there are some things that we learned out in the Gulf that we will need to apply more money to solve those problems.

Senator LEVIN. Just in closing this round for me, this committee is fortunate to have both Les Brownlee and Skip Ringo on our staff for many reasons. One being their unique background. That is invaluable to this committee and this subcommittee. It is interesting to hear how initiative actually bears fruit in the way that you have described. Thank you. Senator Wallop.

STINGER

Senator WALLOP. Thank you, Mr. Chairman. I would like to go back to the Stinger for a series of questions. I have three there. One is how many reload Stingers does the Army have for its Avenger system in excess of the basic eight rounds in the launchers?

Mr. CONVER. We are going to have to scramble here a little, Senator Wallop.

Senator WALLOP. You may provide the answer for the record if you like.

Mr. CONVER. Yes, sir.

[The information follows:]

STINGER

The issue of the Stinger reload round availability needs to be addressed across the entire Army. Based on the fiscal year 2000 Stinger missile basic load allocation for Stinger teams, Avenger fire units, and ATAS aircraft, there will be only 896 reload rounds throughout the Army. This represents a 27,188 missile shortfall of our inventory objective.

AIR-TO-AIR STINGER

Senator WALLOP. The second question will probably be the same thing. How many reload Stingers does the Army have for its air-to-air Stinger assets?

Mr. CONVER. Sir, let me try very quickly. The issue with Stingers is because it can be moved from system to system, it is not an easy one to answer because we do not allocate them precisely to systems. The commander is given an allotment of Stingers. He allocates them to the various systems as he sees fit based on the current threat. So they overlap systems, but we do have Stinger inventory objective, and we do have a rough order of magnitude basically.

Senator WALLOP. I appreciate the difficulty, but, of course, that also provides a difficulty for you.

Mr. CONVER. Senator Wallop, I would like to add a footnote to what General Beltson said. You asked us essentially how many Stingers do we have for various missions. I will tell you that the Army spends a lot of intellectual and other energy arguing that the answer to your question is enough. We find that when we have this discussion there is a natural friction between those who need to come up with the dollars to pay for cuts in the Army's budget and those who are concerned about the industrial base. There is some natural tension that exists there. So we find ourselves arguing a lot with the folks who would say we have all those we need and we have enough for each airplane, we have so many loadouts per system and so many for air-to-air, so many for man pads, so many for Avenger. Setting that all aside for a moment, we can come back to you and frame an argument that says we have enough, and I am sure there are those in the Army who spend a lot of time and effort doing that.

Personally, however, I think there are other considerations that come into play that are along the lines we discussed in the last round of questions that have to do more with the industrial base. So it is not sufficient, in my view, to argue that we have enough to equip, kind of, the minimum that we would need in a warfighting situation. We would like to have a margin of safety not only from an operational point of view but from an industrial base point of view. So I find myself telling those guys wrong answer, let us go back and take another look.

Senator WALLOP. Yes. The problem with characterization of enough is that the person who characterized it that way will not be around when you find out that it was not, and somebody else will be current and will be blamed.

The Army has needs for air-to-air capabilities on the new LH helicopter. The question is where would those assets come from and what percentage of the Stinger stock will exceed the design shelf life by the time the LH is in full production?

Mr. CONVER. That gets to the idea of mine that sooner or later we are going to have to wean ourselves away from the Stinger as we know it and develop a missile, in my view. I am not a user, I am a developer, but in my opinion at some point we need to wean off the Stinger as we know it and develop a new missile for air to air. That missile could be a follow-on to the Stinger based on the

Stinger technology, based on the Stinger air frame. It might be something quite different. So far I do not think we have invested enough intellectual or financial capital in looking at that, but again I would tell you that the official Army answer would come back to you that we have enough RMPs to equip the LH and, indeed, that the LH is configured to be compatible.

Senator WALLOP. And within design shelf life?

Mr. CONVER. Yes, sir. I believe that argument would be made. The Stinger is basically a wooden round. It is delivered in the canister called a wooden round. It stays there; it is hermetically sealed and all that. It has a pretty healthy shelf life, and I cannot tell you exactly what it is, but unless we are talking about out in the year 2010 to 2020, I am sure that the shelf life is adequate to carry us through the early part of the next century.

AIR DEFENSE ANTITANK SYSTEM (ADATS)

Senator WALLOP. The same perspective on the ADATS. Last year this committee recommended termination of it due to reliability problems and projected high unit costs. We receded in conference to the House. I understand the Army and the contractor are working on a program to resolve the reliability problems. Is there a status report? Are we on schedule on the reliability?

Mr. CONVER. Let us share this answer. I will give you the short answer and let General Beltson fill in for me. Basically, what we have done is set up a test program with intermediate milestones. You may recall, and I think a lot of the basis for your action last year—and by the way, we do appreciate your receding to the House—was that our mean miles between failure were unacceptably low and we had no intermediate milestones to get us to where we needed to be at the end of the 2-year period. So what we have done is we have put into the program what we call a 2-year reliability maturation phase, and as part of that we also have intermediate milestones, milestones A, B, and C.

Now the contractors view these milestones quite properly, I think, as pass or fail. If they do not meet that first one, they have good reason, I think, to believe that the program will be terminated either by ourselves— —

Senator WALLOP. Yes. Excuse me. In this process, have you looked at alternatives to it such as Star Streak, or is it still self-contained?

Mr. CONVER. Sir, that is a bit of a separate issue for us. Yes, we are looking at Star Streak, but just to conclude the status report on ADATS, the contractors are delayed in doing this first test A, and they are delayed because they want to make darn sure that they make it. They need to start this month in order to stay within a reasonably achievable schedule to finish all three milestones. We are sticking with them, and if they do those tests and they do not make it, then we will take appropriate action.

Right now we are looking at the Star Streak not so much as an alternative to ADATS, but we are looking at it both for application on the airborne platforms as an air-to-air missile candidate, and we are also looking at it as a candidate for the Avenger system, and we are talking to the Brits. They have had a little trouble with the

Star Streak program, too. Their tests have been delayed. Our Secretary is personally interested in the Star Streak. The Shorts Brothers folks have been in to see us a lot, and we are looking at that but not as a replacement or a surrogate for the ADATS.

General BELTSON. Sir, we tried to budget for a foreign weapon evaluation of Star Streak in 1991. They were not ready, but we are prepared to try to budget for it again in 1992 so we can evaluate it as a complementary missile.

We did do a study and analysis of whether Avenger in some fashion could replace ADATS, and that study was delivered to Congress. It pretty well concluded that no, it could not.

One last point on the ADATS. The exit point A was scheduled to be done with the fire units 1 and 4, and then the follow-ons were scheduled to be done with production units. But when the contractor got to the starting gate for exit point A, we discovered that fire unit 4 had the equivalent of over 1 year of intense combat and had pretty well been worn out and was not going to make its reliability. Fire unit 1 would have made it. We have converted to fire units 5 and 6, and we have so notified Congress. 5 and 6 are production units. They are the next ones off the line. The contractor tells us he is ready to go. He is about 3 months behind what we had forecasted for his schedule, but we have capped the expenditures at this point. We hope that he will get off the starting point and we will get through exit point A. We should know in about 2 or 3 months.

Senator WALLOP. I hope that one of the reasons that you are grateful that we receded to the House is that you recall the rest of the trade, which was JSTARS and ATACMS. So far, I think we got the better part of the deal. [Laughter.]

Mr. CONVER. Yes, sir.

Senator LEVIN. Senator Shelby, we welcome you back. You were unable to be at our last hearing because of the passing of your mother. She lived a long and fruitful life. We are delighted to have you back as one of the most active members of this subcommittee.

FIBER OPTIC GUIDED-MISSILE (FOG-M)

Senator SHELBY. Thank you, Mr. Chairman. I hope I live that long, 93 years. I appreciate your thought.

Secretary Conver, recently you met with General Chen, Commander of MICOM, to discuss the future of FOG-M. What can you tell the subcommittee about your plans for FOG-M?

Mr. CONVER. Sir, I guess the first thing I would like to tell you is, as I have told you many times, I am personally committed to resurrecting the FOG-M program from the ashes. We do not want to rehash old ground, but that program had gotten to the point where we had to give it a mercy killing. Now having done that, we need to resurrect it as soon as possible. That has been my goal and will remain my goal.

Senator SHELBY. You liked the concept but did not like the cost?

Mr. CONVER. Yes, sir, that is correct. We had an overrun there. We had a contract for $130 million. They came in at about half of the Government estimate. We had a contract for about $130 million, and when we pulled the plug on it the estimated completion

was $400 million and still rising. So as uncomfortable as I was answering the question why did you cancel that wonderful program with that great technology, I would have been far less comfortable answering the question why did you not cancel it with a 200 percent overrun and no end in sight. So frankly, as difficult as it was, in retrospect it was kind of a no-brainer decision.

Now turning to the future, which I think is more pleasant, we made some mistakes the first time around on FOG-M, and we are determined not to make them again. The mistakes, in my view, were twofold.

First of all, we did not have the FOG-M technology sold within the Army as broadly as we might have. In fact, as you know, the air defense artillery branch was going to be the advocate for the FOG-M system. Now it is incredible to me that that technology could not have been accepted more widely within the Army, and I think that is a reflection of the general problem that we have that it seems to work better when the users are aware of something and they try to pull it into their branches as opposed to when we come up with some brand new technology that nobody has ever used before and we in the acquisition community and the technology community try to push it into the branches. I think that is what we saw. So I basically took the view with the users that if we were going to resurrect this program, I would not agree to sign the acquisition plan until and unless we had all of the branches take a look at this technology and acceptance of this technology in as many of the branches as could use it. So we have gone back and done that. We now have the infantry branch as a proponent. The primary purpose of the weapon will be anti-armor, defilade to defilade type target.

Senator SHELBY. That is what it started out with.

Mr. CONVER. That is what it started out to be, yes, sir. That is now and should have always been the primary use. We also have as kind of a co-proponent for it the air defense branch, and, of course, the armored guys will be involved in it to the extent that in operational units the infantry and the armor tend to merge somewhat. So we have three branches involved in it, two on a proponency basis, and that is the first thing.

The second problem we made in the FOG-M program is we tried to do too much at once. We had a very, very ambitious system. We had a system that was even nuclear hardened. It was a long range system, had a variable speed motor, had both an EO daytime capability and an IR nighttime capability. We tried to build if not the Cadillac of surface-to-surface weapons or surface-to-air weapons, we certainly had a pretty glorified Chevy. So what we decided we would do this time would be we would scale back our initial appetite, and we would try to get a relatively simple austere system in the field as early as possible, after which we would embark upon or in parallel with which we could embark upon a preplanned product improvement to add extended range, nighttime IR sensor, et cetera.

Now General Chen came up and briefed me. The weeks kind of blend into one, but I believe it might have even been last week. I asked General Chen to do this because none of my Program Executive Officers (PEO) can look as broadly as he can. My PEOs, one is air defense; another guy looks at fire support. So General Chen was

the logical guy. He came back with a fairly conservative recommendation that said if you want to do this system right, an austere system, and so on, we can get you something through FSD in 6 years. We can give you something in fiscal year 1997. I said, well, that might meet all the wickets of being conservative in our approach. It does not meet the common sense reasonable man notion that we have already flown this system in an IOT&E version and, therefore, it should not take another 6 years and, by the way, $300 million to complete the FSD for a system that basically is ready to start FSD. So I asked General Chen to come back with some options that would give us more accelerated acquisition, and that is where we stand right now. I am waiting to hear back, and I expect to hear back from them the week of the 27th, I believe, of this month.

Senator SHELBY. Basically, the Army likes the concept?

Mr. CONVER. Yes, sir, we love it.

Senator SHELBY. General Beltson, do you have some comments?

General BELTSON. No, sir, I was just agreeing with Mr. Conver. I was at the artillery school when FOG-M was trying its technology push, and I know we rejected it at the time because it was such a short-legged device. I think that one of the potential uses in the future is when you can work in the longer range category. We can certainly do a lot of interdiction with it, and I think we would be delighted to take it as a P ^{3} I.

LIGHT HELICOPTER (LH)

Senator SHELBY. Shifting over, I think Senator Wallop and possibly Senator Levin have already gotten into the Light Helicopter (LH), but I was not here so I want to touch on it briefly. Obviously, I support the plan. That is a priority for the Army, it is my understanding, for the future. Where do we go and how fast are we going to need it with the success of the Apache? Secretary Conver?

Mr. CONVER. Sir, we have never looked at the Apache and the LH as being competitors. We look at them as being complementary.

Senator SHELBY. One augments the other?

Mr. CONVER. Yes, sir. The LH is really a light scout attack helicopter, and, as General Beltson mentioned, there were some occasions in the Gulf where the Apaches had to do their own scouting. I am not going to go back and recite the Operation Desert Storm experience as a justification for the LH because the air defense environment over there was benign enough that, frankly, the survivability attributes of the LH would not have been tested very stringently in that environment. So we are not going to try to turn Operation Desert Storm into the justification for all of our favorite systems, but clearly if you have a situation where you have insufficient AHIP OH-58s around—we lent a lot of those to the Navy, and we still have not gotten them back, by the way, which is another issue. But we gave a lot of the AHIPs to the Navy, and we had insufficient assets, and there were some missions over there in the high hot or the conditions where the AHIP had some limitations. We think that is a great airplane, and we fully support it, but there were some cases over there we did not have enough of

them or the capabilities were such that LH could have been used as a scout, so you did not have this heavy attack airplane having to serve as its own scout. So I guess that is where I would come out on that.

Senator SHELBY. Do you have any comments, General Beltson?

General BELTSON. No, sir. I agree fully with Mr. Conver.

LIVE AGENT CHEMICAL TRAINING

Senator SHELBY. Mr. Secretary, I want to jump over and get a little parochial—Fort McClellan. You both know that the Army has proposed to close Fort McClellan. It is on the base list. We all know that that is where the live agent training has taken place as far as chemicals are concerned. Last year, Mr. Secretary, before this committee you indicated your support of, as I understand it, the live agent environment training. What is going to happen now? Are we just going to disregard live chemical training if we close McClellan? Do you want to comment?

Mr. CONVER. Senator Shelby, let me start by saying that there are many things I am grateful for in my life. One of them that ranks fairly close to the top of my professional life is that I have nothing to do with base realignment and closure. [Laughter.]

Having said that, I have a little bit of information on Fort McClellan, and this is not a subject that is as near and dear to me as it is to you, and I am not really up on the issue but I can tell you that when we close it we intend to relocate the chemical school to Fort Leonard Wood in Missouri. Apparently the wisdom of that move is something I cannot comment on, but the feeling is that will meet the needs of the chemical school. The chemical decontamination training facility I understand is to be placed in caretaker status. I guess I am not prepared to comment on what that does for our capabilities for decontamination, but I would be happy to speak to those who are not so fortunate as I and have responsibility for this and provide you an answer for the record.

[The information follows:]

CHEMICAL DECONTAMINATION TRAINING FACILITY

The Chemical Decontamination Training Facility (now called the Chemical Defense Training Facility) provides soldiers with the opportunity to train in the presence of live agents in a safe, controlled situation with no negative impact on the local environment. The training received lends credibility to the chemical soldiers as they train others in defensive measures and reduces elements of fear amd self doubt which could be life threatening on a contaminated battlefield. With the Chemical Defense Training Facility, soldiers have the benefit of operating chemical warning, protective, and decontamination equipment in a live, toxic environment.

Since Fort McClellan was removed from the final 1991 Base Realignment and Closure list, the Chemical Defense Training Facility will continue to remain open and operational.

Senator SHELBY. When we have a caretaker status and they close a part of the base, that creates a real problem in the community.

Mr. CONVER. Yes, sir.

Senator SHELBY. An environmental problem and so forth.

Mr. CONVER. Yes, sir.

Senator SHELBY. Maybe we need to develop this more with the Secretary.

Mr. CONVER. Yes, sir. I would be happy to.

Senator SHELBY. My time has expired. Thank you.
Senator LEVIN. Thank you, Senator Shelby. Senator Wallop.

DEVELOPMENTAL ENVIRONMENT

Senator WALLOP. Mr. Chairman, let me go back to the environment which Mr. Conver has described and the committee knows only too well. I think you have to ask yourself how many developmental anti-armor systems we can afford in that environment, tanks, tank helicopters, LOSAT. So I would have to ask you if the range and indirect fire, the characteristics of FOG-M, make this a good weapon for the infantry, particularly in the environment in which we now find ourselves?

Mr. CONVER. Is this in light of the belief that we have too many systems?

Senator WALLOP. I do not know whether you have too many or not, but you have a lot of them, and you have an environment in which you have five of them in development in an environment which is decreasing both in RDT&E and in procurement. It seems to me I have to prioritize in there somewhere.

Mr. CONVER. Let me try to address this redundancy issue in a way that I hope will be satisfying. I would like to start out in sort of a general way here. We found in the Operation Desert Storm experience that many of the weapons that we had developed for the toughest target, which is basically the tank target, the anti-armor target, found applications for many lesser included targets that if you can kill a tank you can also kill just about anything. So, therefore, it seems to me that there is a reasonable argument that can be made, and again this is probably an issue in which reasonable people can differ. But it seems to me that within all the combat branches of the Army, it is useful to have smart munitions capabilities in weapons that have enough punch to take out the toughest target, which is the tank target.

We saw, for example, that the first shots of the Persian Gulf War were fired by Apaches which shot Hellfires not at tanks but at radar facilities, early warning radar facilities. Now when we went back and developed the Hellfire missile, did we develop that weapon so that we could fire at radar sites and dishes and buildings? I do not think so. We developed it for the tougher target, but we developed it with a sufficient flexibility that would have application and a seeker that could lock in on a building as well as a tank and so forth.

So as you look across the Army branches and see what smart munitions programs are anti-armor programs, one might be tempted at first blush to say there are too many because every branch has one, and if you add FOG-M, that gives infantry one more. But if you look across at the Hellfire missile, and we have several variants of that, the advance versions which will go in the LH and so forth, if you look at the artillery we have SADARM, we have Copperhead, and so forth and so on. You can go across the entire spectrum of the Army's combat operation.

Personally, I do not feel uncomfortable with the notion that we have too many people, too many systems doing the same job. If you add FOG-M to the systems that are in the inventory and under de-

velopment, does this give you critical mass and the house of cards crumbles? I guess my personal judgment is I do not think so. I think the FOG-M is a very, very unique technology. It enables us to do things that other systems do not.

For example, one of the most exciting things in our development stable that I consider personally the most exciting program we have is the LOSAT program. This is a kinetic energy missile. It hits the target with such energy, which is like five times the energy of a tank round. It does not matter what kind of armor you have because you blow the turret off. It gets us out of the armor/anti-armor cycle.

Now we have that weapon under development. Should the existence of that weapon argue that we should not also do FOG-M? One could argue that, but I would say that LOSAT is a direct fire weapon. FOG-M is an indirect fire weapon capable of direct fire, capable of being fired from defilade against a target in defilade. Frankly, that is a capability that I would like to see the Army have, not just in the infantry but also in the artillery, eventually the air defense, and so forth.

RESEARCH AND DEVELOPMENT BUDGET REQUIREMENT

Senator WALLOP. I would suggest to you the problem you are looking at there is you have no time over the area. You had better find something to hit rather quickly or you are out on your stationery targets. Even your experience with RPVs, it is extremely difficult to identify such things. So definitely unless you have some kind of reconnaissance capability to tell you what is in defilade, you are not going to be able to use it for that anyway.

Mr. CONVER. We are getting into the area that I am not only reluctant but unable to discuss in open hearing, but I will tell you that I have personally witnessed demonstrated capabilities that render that problem virtually nonexistent, and we would be pleased to share that with you under the proper circumstances.

MULTIPLE LAUNCH ROCKET SYSTEM

Senator WALLOP. Thank you, Mr. Conver. Let me go to the Multiple Launch Rocket System (MLRS). It is my understanding that you have received money to buy about 20,000 replacement rockets to those fired in the war and have also been told that you need about $15 million added to your 1992 budget to complete the quantity for the multiyear buy and some $3 million to do some development work to extend the range. Is that generally correct?

Mr. CONVER. Let me see if General Beltson would like to take that?

General BELTSON. You are accurate, sir. The 1992 budget summation of the Army in essence broke a multiyear contract condition which required us to buy a certain number of service rockets, practice rockets, and also launchers. But with the supplemental we are within $15 million of retaining the pricing benefits of the multiyear which in 1992 is the fourth year of the multiyear. So the $15 million would cover the multiyear, and we would be grateful for that. We are looking at extending the range, and we would like to do some R&D to extend the range of this really excellent weapon.

We do not think that this is a very high tech issue. It is just a question of doing some R&D and some testing.

PATRIOT MISSILES

Senator WALLOP. This is the last question for this round. I understand that the House Armed Services Committee included $200 million for 310 Patriot PAC-2s in addition to those already provided for in the Operation Desert Storm supplemental which I understand to be about 125 missiles more than the 158 actually fired. Are these numbers correct, and do you need the additional 310 missiles that the House is providing, again in this environment?

Mr. CONVER. Let me just make a general remark and then ask General Beltson to wrap it up. We went through a fairly rigorous analysis putting together Operation Desert Storm and trying to figure out how many replacement items of all kinds of equipment we needed. The simple answer on Patriot is we fired 158 and, therefore, we needed 158 to replace them.

There is another factor involved, and that is that our inventory is a mix of PAC-1 and PAC-2 missiles. We probably have enough total missiles that we need, but we do not have enough of the good ATBM-capable PAC-2 missiles. So the issue there became one of how many do we need. They should obviously all be PAC-2. Should the PAC-2 missiles be new production PAC-2s or should they be PAC-1s reworked with a new fuse and warhead to a PAC-2 configuration. So we have the numbers on that, and I will just share with you. This is an area where we are getting into requirements and the answer is a little squishy, but we probably could benefit from having more than the 158, and the precise number and whether they are new ones or retrofits is subject to some judgment. Maybe General Beltson can give you some of the details, sir.

General BELTSON. Sir, there are really two parts to the answer. The 310 that would come out of the House money would more than adequately cover the balance of the requirement that we have for PAC-2s. In fact, we need about 274 to finish off the requirement for PAC-2s, so the 310 is a little bit of an overkill. You can do that one of two ways. You can either buy new production or you can rework some of the excess PAC-1s. That is kind of a judgment call as to how you would like to do that.

Probably the larger issue, though, is once we have done that where do we go with Patriot and Patriot production? This is another industrial base issue. We are going to try to work on something analogous to PAC-3, which is a multi-mode seeker, and the issue is when will that be ready for production, and do we need to bridge the gap in the Patriot line to get to the PAC-3. That is more than the 310. That is another issue. But yes, sir, in answer to your question, the 310 would cover our requirement with a few spares.

Senator LEVIN. Thank you. Senator Shelby.

FOG-M NONLINE OF SIGHT (NLOS) CAPABILITY

Senator SHELBY. Thank you. Secretary Conver and also General Beltson, how significant is it that the FOG-M is nonline of sight?

Mr. CONVER. I think that's a fairly significant capability. It gives you a capability of operating both in an offensive and defensive

mode. You can fire from defilade. You do not have to expose yourself to enemy fire in order to fire it.

I guess the Gulf situation provides a fairly good example of how this weapon might have been used, because when you have enemy forces that are dug in or behind various protective sand berms and so forth, they are relatively invulnerable to direct fire except in the instances that I mentioned in my opening statement where we could actually fire the tank round through the top of the sand berm.

But if you had the capability to stand off at a fairly substantial distance, fire a weapon that would fly up to altitude, enable you to look around the choir and attack from the top targets in defilade or in some sort of protection, that is a fairly significant capability, and I can tell you that the infantry and the armored guys are very enthused about having such a capability.

Senator SHELBY. General Beltson?

General BELTSON. I agree with Mr. Conver. I think the uniqueness of the NLOS is the defilade issue and not only from a survivability perspective but for an ability to dig out targets that are in defilade that we cannot get at with a direct fire weapon. Hovering helicopters are one and other targets that are in defilade perhaps in some areas we are preparing to attack. You could get at them where they are relatively invulnerable at this time.

Senator SHELBY. Thank you, Mr. Chairman. That is all I have.

ARMORED GUN SYSTEM (AGS)

Senator LEVIN. Thank you, Senator Shelby. Mr. Secretary, I would like to address the question of the Armored Gun System (AGS). We have been trying to develop a light tank now for many years. Is there agreement within the Army that something is needed here and what you can afford? What is the status of that?

Mr. CONVER. Yes, sir. There is agreement within the Army that we need this capability. This has come to a head, I guess, in the time that I have been in my job. I keep hearing about an armored gun system, but General Beltson and others tell me that this issue is one that has been kicking around in the Army and debated between the users and the acquirers and the budget people since 1972, I believe General Beltson told me. But we are now very serious about it. We found ourselves in an anomalous position here some months ago. We were at a stalemate between the user community and the development community because the user community—and I include the Chief of Staff, General Vuono, in this—was quite anxious to get this capability fielded early, and there was some feeling on the part of the users and the chief that we ought to have this capability in the field by fiscal year 1995.

My experts up in Warren, Michigan advised me that because the users' requirements were stringent enough that we had to do some developmental work, no pure NDI system would work to meet the users' requirements, that we would have to do some developmental work, and that the earliest we could achieve an operational capability was 1997. So we had a 2-year disparity between what the users wanted and what the development people, my people, said that they could deliver. So we went round and round about this for

about 4 months, and every time we thought we had the problem licked somebody would tell the chief those development guys are talking 1997 again, and the whole thing would blow up.

So finally what we did is General Sullivan got everybody in a room, General Foss, the Commander of TRADOC, myself and General Tuttle, the Commander of AMC, a whole slew of two- and three-star generals and senior civilians, and he locked the door on us and said, okay, we are going to work this out. What we came out with was the position essentially that we could both agree to. First, the users agreed to make some very modest compromises in their requirement, but basically they wanted to keep their requirement intact. We were able to convince them that if they wanted mostly the full requirements, 1995 was not going to work, and so we now have a target date of 1997.

I will tell you, Mr. Chairman, I am absolutely convinced that if we try to force this decision to get an earlier delivery date that we will end up with an acquisition program that gets broken somewhere down the line just because of all the steps we have to go through with competition and development and testing and OSD reviews and so on. 1997, in my view, is the best we are going to do.

Senator LEVIN. Is this going to be an off-the-shelf item, basically?

Mr. CONVER. No, sir, not purely. We are going to call this a modified Non Developmental Items (NDI). In fact, if you look around it is very uncommon to find something that is a pure NDI, but in this instance we have 10 companies that have expressed interest in this. I believe six of them are foreign companies, four are domestic. Each of those companies has a vehicle that meets some but not all of the AGS requirements. So because the user is unwilling to accept any of the pure NDI systems without modification, we are going to reject that approach and go to a modified NDI program. We will select 1 of these 10, and then we will do some additional development to correct the deficiencies of whatever vehicle we pick, and then we will start to produce it after some modest development work.

105 MILLIMETER CANNON

Senator LEVIN. Is the Marine Corps trying to develop a 105 millimeter cannon? Is the Army going to accept that?

Mr. CONVER. Not for sure, sir, but it looks as if there is a strong possibility we will be able to use either the LAV turret, the 105 gun being developed for the LAV turret, or both. General Beltson I think might have the statistics. I think eight of our competitors are going to use LAV 105mm gun.

General BELTSON. Sir, the 105mm gun that is being developed is being developed by the Army. It is from Benet Weapons Lab. It is an outstanding gun design. Eight of the 10 contractors have stated that they would use that gun specifically on their development, and 5 of the 10 said they would use the entire LAV turret with the 105mm gun. The Marine Corps is working the R&D in conjunction with the Army. We are happy with the gun. It will shoot the AEI-105 ammunition, which is a condition of our requirement. It is an excellent gun.

AH–64 HELICOPTER

Senator LEVIN. On the AH–64 helicopter issue that you have made reference to, last year we asked the Army to develop a master plan to modernize, update the AH–64. We got outlines of that plan, but there is not a lot of details in it. How many configurations are there of the Apache today?

Mr. CONVER. Right now, sir, we have one, the Apache-A, and we have plans for a modest modification program that probably does not quite deserve to be called an upgrade program, but we call that Apache-B. That is in our budget request, but we do not yet have any of those approved or fielded.

Senator LEVIN. You say it is in your budget request. Is it in the administration's budget?

Mr. CONVER. Yes, sir. We have $442 million over the Future Years Defense Plan to upgrade Apaches from the A configuration to what we call the B configuration.

Senator LEVIN. Will they all then be upgraded, all the Apaches?

Mr. CONVER. Yes, sir, but only to the limits of what is in our Apache-B configuration. Basically, what we are doing there is making a series of avionics improvements. We are basically taking a collection of engineering change orders that have accumulated, most of them in the avionics area. We have a SINCGARS capability, a GPS receiver, and some other avionics improvements, and we are collecting those up into what we are calling an Apache-B configuration, but I do not think we are going far enough to call that a true upgrade program like we have talked about on the tank.

APACHE UPGRADE (LONGBOW)

Senator LEVIN. Then all of the aircraft in the AH–64 fleet will be standardized?

Mr. CONVER. No, sir, that is not true. Let me ask General Beltson.

General BELTSON. Sir, our game plan was to configure 227 of the Apaches to the Longbow configuration.

Senator LEVIN. To the what?

General BELTSON. Longbow. That is the Apache Longbow. That is a fairly significant upgrade, including a new engine and the fire control radar to fire the Longbow missile and some expanded avionics. The balance of the fleet, which is 580, would have the B upgrades, so in essence you would have two configurations. Now if you did the math correctly, that is 807 minus the attrition, the birds we lost in the Gulf.

Senator LEVIN. When will the 227 be upgraded? What is the date for that?

Mr. CONVER. I think the Longbow program kicks into production late in this decade, I think in the 1997–98 time period. So we are looking at another 7 years or so before we start delivering Longbow Apaches.

Senator LEVIN. That is the beginning?

Mr. CONVER. Yes, sir.

General BELTSON. The beginning, sir, is April 1995, our projection for the beginning of the Apache Longbow program; but, of course, it will extend.

Senator LEVIN. When will it be completed?
General BELTSON. I will have to provide that for the record.
Senator LEVIN. All right.
[The information follows:]

LONGBOW APACHE

The last Longbow Apache, aircraft No. 227, is projected for delivery in fiscal year 2003.

LONGBOW COST

Senator LEVIN. What is the cost per AH-64 on that one?

General BELTSON. The cost is about $6.3 million for an Apache Longbow.

Senator LEVIN. Is that a fairly heavy cost for what we are getting out of it?

General BELTSON. No, sir, we do not believe so. We believe that is a significant upgrade in capability from two perspectives, one from the air frame and also from its combat capability, because it not only gets an upgraded engine, avionics, manprint cockpit, cooling, and some upgraded power, but at the same time we embed in the air frame an integrated data bus and fire control radar, which will allow it to shoot a fire-and-forget missile. That is the Longbow missile which really significantly expands its warfighting capability.

Senator LEVIN. Has there been an increase of cost in that program?

General BELTSON. There have been some cost increases, but they have been right now on the modest level. They are not giving us a terrible concern. I mean, we are always concerned.

Senator LEVIN. There has not been a significant cost increase in the Longbow program?

Mr. CONVER. We probably ought to distinguish between the development and the production costs. We think the production cost is independent of what is going on in the development program. We are getting some very preliminary indications from the contractor performance data that they are slipping a bit in cost and in schedule, and that is not an uncommon thing. Usually what you see is some cost slips and then the schedule slips sort of follow.

I think perhaps these development problems are due to the fact that McDonnell Douglas Helicopter is quite preoccupied at this point with remaining viable as a helicopter producer, and that is certainly a major distraction for their programs. We are aware of the start, the early indications of some development cost and schedule problems, and we are absolutely on top of it, and we are working it. No promises on how that is going to come out, but we are aware of the problems in development, we are working them. In no way do we think that the development problems will have any effect whatsoever on the production cost of this once we complete the development and go ahead and start our production in 1995.

Senator LEVIN. Senator Wallop.

Senator WALLOP. Mr. Chairman, I have only a few questions remaining. Before I get into them, though, I would certainly like to observe for you and for the committee the extraordinary role that Dr. Hamre plays in our deliberations. His skill and knowledge of

these systems are perhaps unparalleled, and his demonstrated devotion to the security of the country comes close to a national asset. I just want to have the committee know that this is work that is not unnoticed. Sometimes it may seem that way when he schedules hearings on Friday mornings. [Laughter.]

Senator LEVIN. It is very much noticed. The Chair concurs with all your comments, and I know that he is grateful for them. Thank you.

105MM GUN

Senator WALLOP. Mr. Conver, you said that in 1997 the 105 millimeter (mm) gun would be adequate, and thus I wonder why the Army is looking at all the other gun calibers from 140 millimeter to the 155 millimeter for the Block III tank.

Mr. CONVER. Let me ask General Beltson to address the program on the ATACS, because he commanded Picatinny where they did the work on the 140 millimeter gun in his prior assignment. Before I ask him to respond to your question, I would like to echo what you said about the professional staff people on your committee, John Hamre and Les Brownlee and certainly others that serve individual Members and the committee.

I mentioned to Senator Shelby, one of the things that I was real happy about was that I am not involved in base closure. I will tell you a thing I am very happy about in my professional life is that the staff people on all four of the defense committees with whom we work and those who mark the Army budget are a truly extraordinary group of people, and none of them exceeds the capabilities of the staff people on this committee, specifically John and Les and the others. We do not often have an opportunity to put those kind of remarks on the record, and it is a little embarrassing to say it in a one-on-one situation. John is motioning for me to stop because I am embarrassing him, but I certainly echo what you said. Now I would like to get back to the tank gun, sir.

Senator LEVIN. Both of us are grateful for those comments. Thank you.

Senator WALLOP. Please answer the question in light of the environment which Mr. Conver has described and which you have seconded that exists. I confess that I do not think I got an answer to the question that I asked on FOG-M because I asked it in light of the environment, not whether it would be a nice thing to have but whether it is an appropriate thing at this moment in time with a lot of anti-armor capability on and coming on line to develop another one and to assign essentially an artillery role to the infantry. Now we will set that aside because that has been answered, but try to answer in the light of this environment because we seem to be having sort of more irons heating than we will ever be able to forge when we get out of here. It seems to me that one of the questions that has to be asked is which are the ones that really need to be heated so we can take them out and hammer them into something for the modern Army?

General BELTSON. Let me try to answer in the proper context. In a classified sense, we would have to lay down for you the threat and where we think he is going and how tough that target will be.

It was in that context then at the time in my role as the International Deputy and Senior National Representative, Army, that I met with my four power compatriots, which we did on a semiannual basis and which we discussed the threat and when it would arrive and at the same time discussed each other's national development programs.

It was at that time that I discovered, for example, that the U.S. Army was working a 135 millimeter gun, that the Germans were working a 155 millimeter gun, that the French were working a caliber something close to 140, I was not sure which, and the Brits showed me their 140 gun. At that point I said it makes no sense for all four of us to be working different calibers, let us see if we can standardize on the caliber. Through some arduous negotiation, we standardized on a 140 as the caliber that would not only overmatch the threat but would also provide in a cooperative sense a really efficient development program.

One more factor. Benet Weapons Lab had developed a design which would accommodate anything from 120 to 155. It is a variable design breach which allows you to change tubes: so, therefore, once you put the breach in you can fire whatever caliber you want. That is what is being referred to as the lightweight 140. It was referred to as lightweight because it weighs less than the current 120 gun combination we have today; not much, a few pounds, but it is a tremendously unique design. All three of the allies have in essence scrapped their development and have joined us in the cooperative venture.

Now could we go on with the 120? The answer to that question is perhaps. I think we would have to discuss where we think the threat is going and whether we are at the end of the performance envelope for the 120. But with the unique design that would go into the Block III, it would enable you to then either fire the 120 ammunition that you currently have today or a two-piece 120 ammunition. If you really found yourself in an overmatch you could then upgrade it very simply by adding a tube and going to 140 within the confines of the design that you had both from an autoloader perspective and a breach. So it is a tremendously flexible design and one that we are looking forward to and hoping that we can continue.

WATER AND FUEL TANKERS

Senator WALLOP. Thank you. I have a question from Senator Thurmond of you, Secretary Conver. It says the President's fiscal year 1991 supplemental appropriations request for Operation Desert Shield/Operation Desert Storm contains a $17.5 million request under Other Procurement, Army for 5,000-gallon tanker trailers. That request was subsequently deleted by the Department of Defense comptroller and was not included in the supplemental approved by Congress. Based on recent briefings, the resupply of fuel and water during Operation Desert Storm was critical and barely met operational requirements. Does the Army have a need for these tankers and, if so, how can this committee help?

Mr. CONVER. Yes, sir. We have a requirement both for water tankers and for fuel tankers, and I think the experience in the

Gulf validates those requirements. We would not want to get too specific because we are supporting the President's budget. But in any way that you can help us in that, we would be grateful.

ARMY TACTICAL MISSILE SYSTEM

Senator WALLOP. I will pass that to Senator Thurmond. I have two questions left. One is on ATACMS. It is our understanding that they performed extremely well in the Gulf War but that there may now be a requirement for extended large capability. Can you expand on this and give us some indication of cost?

Mr. CONVER. To the first part of your question, yes, sir. The ATACMS performed admirably. But I do not have the details here. In every single instance that we have been able to verify, the ATACMS was fired with great effect. It was primarily used against radar sites, and in every instance in which it was fired it silenced the site immediately. We subsequently confirmed through battle damage assessment and aerial photography and other means that indeed we did take out the site.

The ATACMS became such a precious commodity that the corps commanders reserved use of the ATACMS, and the firing doctrine was changed to the point where the ARCENT Commander had to personally approve the firing of an ATACMS because he did not want to waste them on lesser targets. We had them there in fairly limited numbers.

I will tell you as an aside that the LTV Corporation, the makers of this weapon, did an extraordinary job in ramping up their production. We are in low rate initial production. They did a magnificent job. Bob Parker and the folks at LTV stepped right up to the task, and we got a large number of ATACMS over to the Gulf. I do not know how many we fielded. I hazard to guess. They did a great job of getting it over there.

With respect to extending the capabilities of ATACMS, there are a couple things that are under discussion. One of the things is extending the range and improving the accuracy of the ATACMS, and we have some work under way to do that. Another thing that we have talked about putting in the ATACMS, I guess what we would call ATACMS Block II, which is the capability to use ATACMS with a smart antiarmor submunition that has hard target capability. This would be another armor killer. That is a program that, as I recall, is unfunded in development and production. There is another program in the Department of Defense, a joint program that we cannot talk about in this forum that ATACMS Block II provides a backup for.

In any case, we are extremely pleased with ATACMS. The company did a great job getting it to the Gulf. It did a great job over there, and we are doing some fairly modest things to improve the performance of the system.

MK-19 40MM GRENADE LAUNCHER

Senator WALLOP. Thank you. Mr. Chairman, my last question goes to the MK-19 40 millimeter grenade launcher. The post-Operation Desert Storm reports to this committee, both by the Army and the Marine Corps, give an extremely favorable testimony re-

garding this weapon. The committee provided funds last year to continue this program after the Army terminated it for affordability reasons. The question is, does the Army really need and want more of these weapons, and do you believe the Army should reconsider the decision to terminate the weapon?

General BELTSON. Sir, I would like to comment. I think the word coming out of the Gulf was that the troops were extremely pleased with the MK-19. I do not know if Barry McCaffrey discussed it in his hearing yesterday, but if I am not mistaken, the 24th, I know, is very, very pleased with it. I think the MK-19 probably suffered a little bit from lack of publicity and lack of visibility, and in the rush to take money out of the budget it was one of the casualties. I think that we are going to be at probably about half of our requirement. I think the Army would be delighted to continue it. We will have to relook the decision. Sir, your help would be greatly appreciated.

Senator WALLOP. Thank you very much.

Senator LEVIN. Is that a situation where we could pick it up next year if we cannot do it this year, or is it this year or really never to restore that?

General BELTSON. I cannot answer that, sir.

Senator LEVIN. You do not know what the backlog is?

General BELTSON. No, sir. I do not know where we are in the procurement.

Senator LEVIN. Do you want to try to get that to us?

General BELTSON. Yes, sir. We can do that.

[The information follows:]

MK-19-3 40MM AUTOMATIC GRENADE LAUNCHER

Under the current contract with Saco Defense, Inc. for the MK19-3, the Government must order 841 additional weapons in fiscal year 1992 to fulfill the contracted procurement quantities. Failure to fund the required quantities in fiscal year 1992 will result in termination of the contract for convenience of the Government. Because of a procurement lead time of 18 months in reordering weapons, delayed funding to fiscal year 1993 will result in a 6- to 9-month break in production. This will cause the Government to terminate the current contract and formally compete a follow-on contract for the requisite quantities. The time to announce, compete, and award the contract could add an additional 18 months to the procurement lead time. To date, Saco is delivering according to schedule. The Army has procured approximately 50 percent of our requirement with the fiscal year 1991 procurement. Deliveries to the Army are expected to be completed by June 1993.

ADVANCED ANTITANK WEAPON SYSTEM-MEDIUM

Senator LEVIN. On the AAWS-M, we have learned that the program is going to cost over 150 percent and is way behind schedule. How confident are you that the problems are fixed in the AAWS-M?

Mr. CONVER. Sir, the short answer at this point is that we are a lot more confident than our associates in OSD, but we are working on the problem. Let me try to frame this for you. There are two problems, actually perhaps three, with AAWS-M in my view, the first one being that we embarked upon a fairly ambitious 36-month development program. It probably should not have been 36 months. It probably should have been somewhat longer, and the present program is 48 months. So it is 4 years instead of 3.

Problem number two is that we had a buy-in here. The government estimate on this program was, as I recall, $250 or $260 million. The contractor bid in at $170 million, so we started out $70 or $80 million in the hole by simply buying in and saying I can do this program in 2 notes, and it was really a buy-in of sorts. So they started out in the hole.

FOCAL PLANE ARRAY

A third problem and the technical problem that we have run into is that we have had significant problems with what we call the focal plane array. Now the focal plane array is the sensor element that resides in the missile, and it is a small chip, I would say, about one-third the size of a dime on which is embedded a 64 by 64 staring focal plane array, a series of 64 by 64 matrix of small detectors.

The company that was supposed to build these, one of the co-team members, Texas Instruments, took on a strategy that said we will try to develop a manufacturing technology that will allow us to produce these staring focal plane arrays in quantity. What they do is they take a large chip that is about this large (indicating), and they have a whole bunch of chips on there, and they then try to build them and cut them out and thereby sort of mass produce. They can make them like 100 at a time.

It turns out that this is a fairly difficult thing to do, and Texas Instruments has had a lot of trouble making that process work in a way that produces focal plane arrays of the quality that is needed to meet the Army requirement. So when we went back and looked at the program and realized we had problems, it became apparent to us that we had to quit riding that Texas Instruments horse on the focal plane arrays exclusively. So we have now proposed a restructure of this program which adds money, extends the time from 36 to 48 months, and we are bringing on some second source producers for focal plane arrays.

Now the Hughes Santa Barbara Research Corporation has already demonstrated the capability to produce these arrays, as has Rockwell and at least one foreign company. So we are going to go to Hughes and to Rockwell, asking them to build their variations of focal plane arrays. We know they work; they produce the requisite quality. It is just that they cannot be built as quickly because they are done sort of one at a time instead of mass produced. We are confident that we have the technology in hand now, thus we are bringing the other two producers on to produce these focal plane arrays that are the essential technical element of this system. We are confident that if we can convince OSD of the technical and programmatic issues there then we can proceed to execute the new program.

Senator LEVIN. Is that large increase in development cost going to have a big impact on production costs?

Mr. CONVER. No, sir, I do not think it is going to have a large effect at all. If you look at the cost of the round, we estimate that the cost of an AAWS-M round is going to be $45,000, approximately 20 percent of which resides in the seeker. So the seeker is roughly $9,000 at a total cost of $45,000. That is about 20 percent.

The current estimate that I have from my technical people now is that if we go with this more conservative approach with Santa Barbara Research and Rockwell, they have a less efficient process in the sense that they build these things one at a time as opposed to in bulk, and that stands to increase the cost of the seeker from $9,000 to about $11,000, a $2,000 increase to produce one of these little bitty focal plane arrays. That would increase the total cost of the round from $45,000 to $47,000. If we are wrong by a factor of 100 percent and it is not a $2,000 increase but a $4,000 increase, we are still under $50,000 per round. To give the soldier a fire-and-forget anti-armor weapon, I would say that is worth it.

General BELTSON. Sir, I would like to add, to put the focal plane arrays in proper perspective. The target set that we are after has, I believe, 13 specific targets in that set. The focal plane arrays that TI is making can handle 12 of the 13 targets. There is one target that it is unable to take, and that is what we are driving for when we talk about the focal plane array. So it is not as if we have a zero capability. We have a fairly good capability. It is just that we would kind of like to have it all the way. Certainly that is a decision down range if it looks like it is a significant cost driver.

Senator LEVIN. Are those 13 targets of equal value?

General BELTSON. Yes, sir. They are of equal value, but they are in different conditions within the array.

Senator LEVIN. Are the conditions prioritized in some way as to what is the most important one?

General BELTSON. In some sense they are. This particular target is in a battlefield obscurant condition that makes it very difficult to pick out of the array.

Mr. CONVER. It is a cold tank at night in the presence of bispectral smoke, and that is the toughest target there is. I am told that in terms of the target mix that particular target comprises about 1 percent of the total targets that we would expect to see on the battlefield.

Senator WALLOP. Is there a decision coming that is unavoidable as to whether or not this is sort of goldplating the requirement?

Mr. CONVER. No, sir. We are not going to relax the requirement for the focal plane array detectability at this point, and I would urge that we not do that. Although I will tell you that I have gotten a message from General Burba, Commander of FORSCOM, which said we need this weapon for the infantry so desperately that if it were necessary to compromise the requirement in order to get the system approved, I, General Burba, would be willing to do that. At this point I am not sure that is necessary. We are doing so well with Santa Barbara Research and with Rockwell in delivering the focal plane arrays that meet the requirement at this point I think we are inclined to stick with it.

Now if you asked if you had the opportunity to go back and do it all over again, would you do it the same way, I would probably tell you no, I would have one of these meetings with General Sullivan and we would say let us start with the Class B focal plane array, field that, and then we will product improve the focal plane arrays, and when we get really good at it and we can do the A quality, then we will sort of cut that level of focal plane array into the production line as a product improvement.

Given that we are where we are now, it is a little bit late to be questioning the requirement. I think we are probably better off on balance to proceed as planned.

General BELTSON. One other point, sir, and I would like to add one rider to that. The AAWS-M is the bell cow for focal plane arrays, and so in the sense that it is breaking new ground for focal plane arrays which have great application into a wide variety of other smart weapons systems, that is another reason why we would like to push for the As.

Senator LEVIN. Just one brief footnote question. The design of TI did not quite work. Was that a design that they risked or we risked? Did we tell them to design it that way, or was it their idea?

Mr. CONVER. No, sir. It is their design. They proposed it.

Senator LEVIN. It did not work, and we are still paying for it?

Mr. CONVER. Yes, sir, but they will soon be on their own, and they are going to continue with the work on company money. I visited TI 2 weeks ago, and they are absolutely convinced that they can make this work. They are just not there yet, and we are not willing to wait for them and to continue to fund them.

I will tell you that when they get this thing to work, the way someone described it to me they will be able to pump these things out like popcorn, and they are going to make a pot of money because this will have application all over the Department of Defense and perhaps other places as well if they can ever make it work. We are just not willing to have this program hanging in the balance.

M88 RECOVERY VEHICLE

Senator LEVIN. You made reference earlier to the M88 recovery vehicle program. Yesterday we had some testimony from the 24th Division that the M88 was one of the few trouble spots in Operation Desert Storm. As a matter of fact, there is some testimony that we had to be towing the M88 by an M1 instead of vice versa on some occasions.

General BELTSON. Yes, sir. That is embarrassing.

Senator LEVIN. Should we take another look at that program or some other recovery vehicle program?

General BELTSON. Yes, sir. I guess I would reluctantly agree that that is probably not one of our better stories. As you recall, we did have a program. It was the Improved Recovery Vehicle (IRV) program. We did a tow-off, if you will, between two competitors. BMY won. They have the M88A1E1.

Senator LEVIN. Just to use your language a bit further to push a little further, we had a tow-to-tow. They went tow-to-tow. [Laughter.]

General BELTSON. Yes, sir, they did. They went tow-to-tow. GD was the other competitor. BMY won, and then we took it to operational testing. Unfortunately, in the operational testing the M88A1E1 failed. It failed for three reasons: RAM, power, and the boom and winch strength. At that point we terminated the program.

There is some follow-on testing that we have paid for that allows BMY to continue with their program. We do not have an IRV program at this time. It is going to have to compete in the next Pro-

gram Objectives Memoranda (POM) and budget cycle. I suspect as a result of what happened in Operation Desert Storm it will probably get some increased emphasis and priority, but we are going to wait anxiously for the user to tell us how serious it is and how important it is for us to get on with it. In some sense we are hoping that the new armored system mod program will give us lighter weight vehicles and not create the demand for a huge vehicle to do the recovery. Nevertheless, I think you are right. We need to get on with it.

FAMILY OF MEDIUM TACTICAL VEHICLES

Senator LEVIN. Just a couple of additional questions on medium tactical trucks. The Army is going to be replacing the old 2½- and 5-ton truck with a new family of medium tactical vehicles. The medium truck program has taken some big cuts, Mr. Conver, and this has driven the unit costs through the roof. Was that an Army decision?

Mr. CONVER. No, sir. We had funded approximately 18,500 trucks as part of our first 5-year multiyear program on the Family of Medium Tactical Vehicle (FMTV) program. As part of the budget scrub or the program and budget decision (PBD) process that OSD staff embarked upon last year to meet the new fiscal guidance, the FMTV program was one of the major cuts. OSD reduced the buy and took out enough money, which was somewhat in excess of $400 million over the 5 years, we felt that would reduce the quantity from about 18,500 to 14,500. When we got the preliminary bids in from the three contractors, it appeared that it was more likely that the reduction in the quantity would go down to 11,000. So here we are a year ago with 18,500, and now we are looking at something in the neighborhood of 11,000, possibly a little more. So that program has been seriously wounded in the budget process and is a major casualty of it.

Senator LEVIN. What is going to happen to unit costs now?

Mr. CONVER. Sir, they go up, and we are going to have to wait to get the specific bids in from the contractors before we can give you a precise answer. Obviously the program is one that is somewhat sensitive to quantity, and I might have a number here. I do, but I need glasses to read it. I will tell you it is on the order of 10 percent, I think.

Senator LEVIN. Going from 18 to 11?

Mr. CONVER. Yes, sir. I think unit cost increase is on the order of 10 percent. I could be wrong.

Senator LEVIN. All right. Would you give us that for the record?

Mr. CONVER. Yes, sir, I will provide that for the record.

[The information follows:]

The response to this question was provided by letter dated May 22, 1991. A copy of the response follows.

DEPARTMENT OF THE ARMY,
OFFICE OF THE ASSISTANT SECRETARY,
Washington, DC, May 22, 1991.

Hon. CARL LEVIN
Chairman, Subcommittee on Conventional Forces
and Alliance Defense,
Committee on Armed Services
U.S. Senate, Washington, DC.

DEAR MR. CHAIRMAN: During my testimony before your subcommittee on May 10, I promised you information on savings associated with acquisition of the Family of Medium Tactical Vehicles (FMTV). As you can see on the enclosed chart, the advantage to the Army in operational and support cost savings supports our intended purchase of these vehicles. The savings from the first multiyear contract alone are equal to the investment cost within 15 years of contract award, and the savings continue to increase throughout the 30-year program. Even with the pared down initial buy, $100 million in savings is generated by fiscal year 1998. We need to move on this program to realize the cost benefits as well as to capitalize on the marked improvement in performance and mobility.

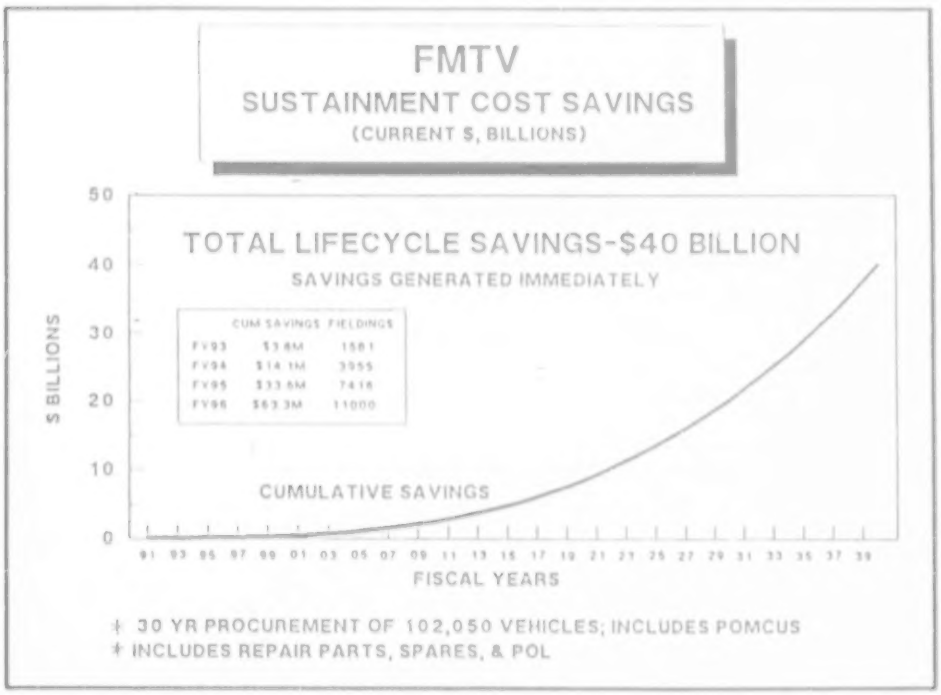
Concerning your question on unit costs, the present government estimates of the manufacturing costs (fiscal year 1991 constant dollars) are $83,563 and $95,752 for the 2½-ton cargo and 5-ton cargo trucks, respectively. Estimated unit costs have increased recently due to both OSD budget cuts and Army updates to the Baseline Cost Estimate. To minimize these impacts, we have restructured the program to increase quantities of the less expensive 2½ ton trucks, reduced the more expensive 5 ton, and deferred the buy of expansible van, fuel tanker, and trailers until the next multiyear contract in 1996.

I trust this information will be of assistance. Thank you for your continued support of this important program.

Sincerely,

STEPHEN K. CONVER
Assistant Secretary of the Army,
(Research, Development, and Acquisition).

Enclosure.



Senator LEVIN. Might we also lose a contractor?

Mr. CONVER. That is possible, sir. We have three contractor teams, and we had a series of discussions with one of the contractors yesterday complaining about the reduction in the quantities and also about our contracting strategy which calls for level pricing. That forces the companies to essentially underwrite the cost of initial units when you price this as a commercial item instead of starting out paying more for the initial versions and then going on a learning curve. So yesterday, in response to what appeared to be a problem that I was previcusly unaware of, I directed my procurement chief to take a look at our acquisition strategy. There is nothing we can do at this point about the quantity. We can, however, take a look at the acquisition strategy, make sure we are not putting unfair burdens on the contractors, and driving them out of the competition.

Senator LEVIN. How many contractors do we have in there now?

Mr. CONVER. There are three of them, sir.

Senator LEVIN. We still have three?

Mr. CONVER. Yes, sir.

SLEP

Senator LEVIN. On the Service Life Extension Program (SLEP) for trucks, finally, I think the House has added some funds in their markup to accelerate that program because of our experience during Operation Desert Storm. What is your position on a plan to accelerate that Service Life Extension Program for Army trucks?

Mr. CONVER. Sir, we support it. I recently got a note from our secretary, Mike Stone, who asked me to do what I could to support it. Now he did not send a check along with that, so I am not quite sure how I am going to do it. But we are going to accelerate it.

FMTV COSTS

Like you, Mr. Chairman, I also have a good staff, some of whom are sitting behind me, and they have provided me here with the answer to your earlier question on FMTV costs which I would not read because of my failing eyesight here. For the 2½-ton truck, if I might, the unit cost is going to go from about $55,000 per truck to $75,000. So that is substantially more than the 10 percent that I had estimated. For the 5-ton variant, the cost will go from $65,000 to $95,000. These are rough estimates, but those are more like in a 30 to 50 percent increase. So I apologize for my earlier bad estimate. Again, these are also estimates. We have to wait and see what the contractors say when they come in.

If I might, Mr. Chairman, one footnote to that, the unit cost is one thing that we lose when we reduce the quantities. There is another thing that we lose, and that is the opportunity to reduce our O&S costs, because the data that I have received on FMTV shows that we can buy and operate the new FMTV truck for substantially less than we can operate the existing fleet of trucks. Now that is a fairly astounding statement when you think that your replacement cost plus the operating cost of the new truck is well below the cost of just operating the older trucks. The number that I have been quoted is also astounding. If we had the entire fleets of existing 2½- and 5-ton trucks replaced with FMTV vehicles, the annual sav-

ings that I just described will be on the order of $350 million per year for the 2½-ton truck and on the order of $125 or $130 million per year savings for the 5-ton truck, and that includes the cost of buying the new truck as well as operating it.

Senator LEVIN. Are you saying that if we leased those trucks instead of buying them, the extra trucks that would be——

Mr. CONVER. No, sir. For the cost of buying the truck and operating the truck.

Senator LEVIN. I understand that, but if we do not have the money to buy them—I am not suggesting you lease them. You are saying in effect if we had a lease program that the trucks that we are cutting, that we would actually year by year spend less money to lease those extra trucks and operate them than operating the old trucks that would not be replaced by the leased trucks?

Mr. CONVER. Yes, sir. An interesting thing, in talking to the president of one of the companies yesterday who builds these trucks—now this is not a truck that we can go out and lease because it is not developed yet and this is not an NDI item, as many people think. You have to develop this truck. But the president of this company, and I will not specify one which, told me that in their own company the replacement time for all of the trucks in their company is 3 years, and in our current fleet the average age—I might have these reversed but I think this is correct—the average age of the 5-ton truck is 13 years and the average age of the 2½-ton truck is 22 years.

SLEP

Senator LEVIN. Thank you. The last question on that life extension program is if we do accelerate it, will that jeopardize your efforts to buy a brand new medium truck?

Mr. CONVER. Sir, I certainly hope not. We have a fleet now of over 100,000 vehicles, and the 11,000 vehicles that we are going to buy in the FMTV program and the number that we would improve under a SLEP are relatively small compared to the total fleet. I would hope that those in OSD and those in Congress who would take a look at this would not view the SLEP as a threat to the FMTV program or vice versa, because even with a major increase in the SLEP, the percentage of the total fleet that we would be replacing over the 5-year period would be relatively small. So I hope that our bosses here and in OSD would have the wisdom to recognize that.

Senator LEVIN. Could you provide for the record the numbers comparing the cost of new trucks versus operating old trucks?

Mr. CONVER. Yes, sir. I would be happy to.

[The information is supplied on page 189.]

Senator LEVIN. We thank you both for your testimony, and this subcommittee will stand adjourned.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

PRIORITIES FOR RC

Senator THURMOND. General Beltson, as you know, I and this subcommittee have continually supported the increases in funding for upgrading the equipment of the

National Guard and Reserves. Because of funding constraints, it is imperative that this committee prioritize the needs of the Reserve components. Would you give us the benefit of your experience and tell us, generally, what you believe are the highest priority needs for weapons and equipment for the Reserve components?

General BELTSON. Currently the ARNG continues to be critically short in communications equipment, medium trucks, heavy trucks and trailers, modern artillery and artillery fire support, and modern engineer equipment. Additionally, critical shortages continue in test, measurement, and diagnostic equipment and special tools and test equipment to support modern and advanced weapon systems.

LESSONS LEARNED

Senator THURMOND. General Beltson, based on preliminary analysis of Operation Desert Storm, have you identified any equipment shortcomings that you feel need to have immediate attention?

General BELTSON. All equipment operated better than advertised. ARCENT's ability to overwhelm enemy forces with superior fire and maneuver, achieving unqualified success, was due, in large part, to the technological advantage afforded by modernized systems. Tested in combat (offensive and defensive operations), night and day, in inclement weather, and against diverse threats, Army weapon systems and crews have performed extremely well, validating their effectiveness and efficiency. Missions were completed as scheduled.

ARTILLERY UPGRADES

Senator THURMOND. General Beltson, we were fortunate during Operation Desert Storm that the Iraqi artillery had difficulty with target acquisition and fire coordination since their guns out-ranged our artillery systems. What development program does the Army have to increase the range of our tube artillery?

General BELTSON. The Army's primary effort in this area is its Advance Field Artillery System (AFAS), high priority system within the Armored Systems Modernization program. AFAS will enable our artillery to attack targets at ranges of 40 kilometers or more utilizing an advanced propellant system and an extended range 52 caliber cannon. Additionally, there are ongoing in the technology base, efforts to design an extended range, low drag projectile which would capitalize on the enhanced range capabilities of AFAS when fielded.

GLOBAL POSITIONING

Senator THURMOND. General Beltson, in after-action briefings on Operation Desert Storm, everyone has praised the Global Positioning System and is urging that they be installed in our combat vehicles. Is the Army considering such a move and if not, why not?

General BELTSON. Yes, the Army's POS/NAV Master Plan calls for Precision Lightweight GPS Receivers (PLGR) to be provided for all combat leaders down to squad level. This includes all combat vehicles, and one for every two supply, ammo, and POL vehicles. All aviation platforms, ambulances, recovery vehicles, and maintenance contact teams will be authorized a receiver.

M113 FAMILY SYSTEMS

Senator THURMOND. Secretary Conver, based on briefings on Operation Desert Storm, it is obvious that the M1 and Bradley lived up to all expectations which hopefully will stop all the criticism of the systems. During the briefings it also became obvious that the M113 series vehicles could not keep up with the fast moving Bradleys and M1s. What plans does the Army have to replace such vehicles as the M577 command track and other M113 type vehicles?

Secretary CONVER. The Army fully recognizes the mobility and protection limitations of M113 type vehicles as demonstrated in training exercises prior to and confirmed during Operation Desert Storm. However, the extent of the replacement effort is such that it is prohibitive during a period of constrained resources. In an effort to effect modernization of these critical vehicles within existing resources the Army has determined that total replacement is not feasible. The Army determined that the best approach was to effect improvements of existing vehicle chassis to attain mobility improvements, while pursuing the development of replacement vehicle chassis as part of the Armored Systems Modernization effort.

The Army plans to effect modernization of the M577 command and control vehicle and other M113 type vehicles through the application of a product improvement program which improves the performance of small, lightweight tracked vehicles like

the M113. This program, implemented in January 1987, improves the power/weight ratio and the carriers' ability to withstand small arms fire. These improvements include the "RISE" powerpack, a 275 BHP turbocharged version of the diesel engine and new hydrostatic transmission. Internal Kevlar spall liners provide added protection for the crew, while external fuel tanks reduce the chance of fire within the vehicle while increasing internal storage space. These improvements result in an M113-A3 type vehicle which is capable of maintaining the pace of fast moving Bradleys and M1 Abrams tank.

The Army is also planning the development of a family of vehicles that will assume many of the missions presently accomplished by M113 based vehicles. This family of vehicles, the Armored Systems Modernization (ASM) program, includes six new development systems. Current planning, which addresses affordability issues, limits fielding of the six new ASM systems to Force Package I units, with the exception of LOSAT which will also be fielded in Force Package II. The ASM systems replacing M113-based systems include the Line-of-Sight Antitank (LOSAT) replacing the M901 (Improved Tow Vehicle: ITV), and Future Armored Rearm Vehicle-Artillery (FARV-A) replacing M548 Cargo Carriers, M992 (Field Artillery Ammunition Support Vehicle: FAASV) and some trucks. The Future Infantry Fighting Vehicle (FIFV) will replace Bradley Fighting Vehicle System (BFVS) in Force Package I which in turn will replace M113 Personnel Carriers.

[Whereupon, at 11:21 p.m. the hearing was adjourned.]

45-453 (200)